California Analytical Instruments

600 SERIES CLD
MAINTENANCE AND SERVICE MANUAL

CAI

600 SERIES CLD SERVICE MANUAL

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Section I

Recommended Routine Maintenance

600 SERIES CLD

RECOMMENDED MAINTENANCE SCHEDULE

ITEM	PART NUMBER	ACTION	FREQUENCY
Inlet Filter	310310-2	Inspect/Replace	3 Months
NOx Converter Catalyst	110083-1	Replace	24 Months
Ozone Lamp	410307-1	Replace	24 Months
Pump Diaphragm/ Valve Sheet	310546-1 310547-1	Inspect/Replace	12 Months

Section II

Spare Parts List

RECOMMENDED Spare Parts Price List

600 Series CLD Gas Analyzer

Part Number	Description	Unit Price
110083-1	NO/NO_X Converter Carbon Refill Pack	$70
110378-1R	NO_X Converter	370
310310-2	In-line Filter Element (Sample)	20
310821-1	Reaction Chamber	350
310074-1	Long Pass Filter (Red Lens)	85
310081-1	Reaction Chamber O-Ring	5
310546-1	Diaphragm, Pump (Optional, requires 2)	25
310547-1	Valve Sheet, Pump (Optional)	25
110288-3	EPC Valve Assy (Sample)	675
110568-2R	Capillary, Sample (0-3 thru 3,000 ppm)	115
110568-4R	Capillary, Sample (0-5 thru 5,000 ppm)	115
110569-2R	Capillary, Ozone	115
310762-2R	Capillary, Sample Bypass	85
310235-1	Regulator, Air	35
110415-5	NO_X Solenoid Valve Assembly	315
410307-1	Ozone Lamp (up to 1,000 ppm NO_X)	380
410307-2	Ozone Lamp, High Output (over 1,000 ppm NO_X)	655
410289-1	Fuse, 4 Amp	5

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Section III

Analyzer Components

Analyzer Components

Rear Panel

The following details the rear panel connections:

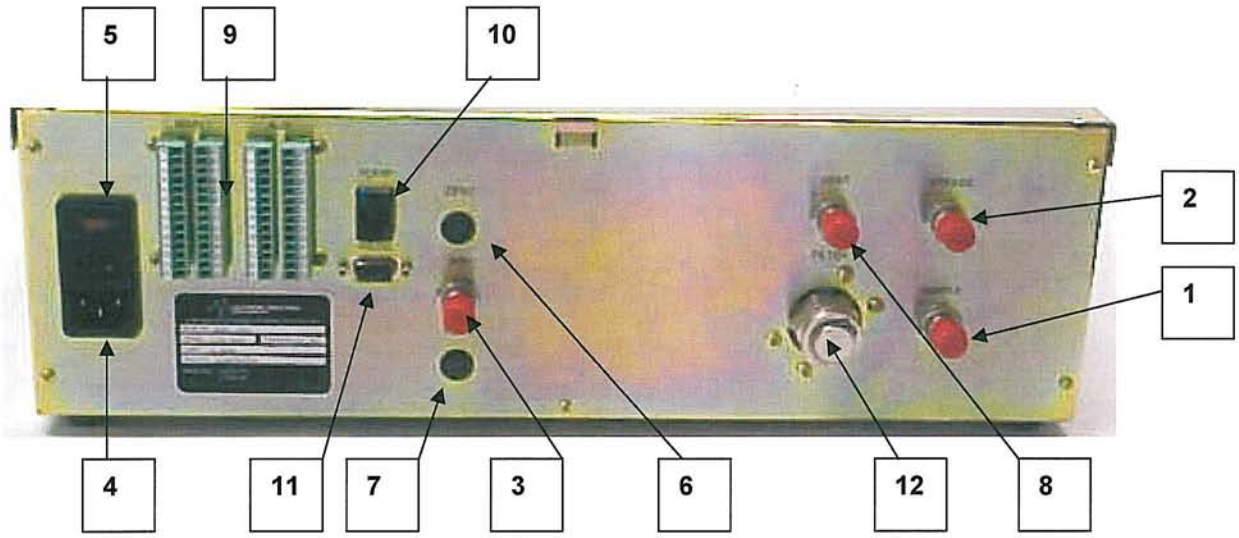


Figure 32: Rear Panel

1. **Sample Gas Inlet:** Feeds sample gas to the analyzer. ¼ Inch Tube.
2. **Sample Gas Bypass Outlet (Vent):** Exhaust for sample. ¼ Inch Tube.
3. **Ozone Air Inlet:** For feeding hydrocarbon free air or oxygen to the ozone generator.
4. **Power Entry Module:** Power connection, power switch, fuse compartment (2 Amp).
5. **Rear Panel Power ON/OFF Switch:** Turns ON/OFF line power to instrument.
6. **Zero Gas Inlet:** For feeding hydrocarbon free zero air to the analyzer.
7. **Span Gas Inlet:** For feeding calibration gas to the analyzer.
8. **Vent:** Exhaust from reaction chamber, ¼ inch tube fitting.
9. **Output Connectors:** Analog Outputs and Remote Functions.
10. **TCP/IP Connection:** Connect Network Connector.
11. **Serial Connector:** Connect Serial Connector
12. **Filter:** Analyzer Filter Housing

Main Connector (Standard 28 Pin Connector)

Pin	Signal	Function	Pin	Signal	Function
1	Analog Output	Ground (Analog)	15	Digital Input	Control Range 3
2	Analog Output	Realtime	16	Digital Input	Control Range 4
3	Analog Output	NO	17	Digital Input	Auto Cal
4	Analog Output	NOx	18	Digital Input	Calibrate
5	Analog Output	NO2	19	Digital Input	Zero
6	Digital Output	Ground (Digital)	20	Digital Input	Span
7	Digital Output	Sense AutoRange	21	Digital Input	Pump
8	Digital Output	Sense Range 1	22	Digital Input	Zero Gas Flow
9	Digital Output	Sense Range 2	23	Digital Output	Span Gas Flow
10	Digital Output	Sense Range 3	24	Digital Output	Sample Gas Flow
11	Digital Output	Sense Range 4	25	Digital Output	Local/Remote
12	Digital Input	Set Auto Range	26	Digital Output	Read Cal Mode
13	Digital Input	Control Range 1	27	Digital Output	Reserved
14	Digital Input	Control Range 2	28	Digital Output	Reserved

Auxiliary Connector (Standard 28 Pin Connector)

Pin	Signal	Function	Pin	Signal	Function
1	Analog Input	Ground	15	Digital Output	Ground (Alarm)
2	Analog Input	External Analog 1	16	Digital Output	Calibrate Alarm 1
3	Analog Input	External Analog 2	17	Digital Output	Reserved
4	Analog Input	Spare Analog	18	Digital Output	Reserved
5	Analog Input	Spare Analog	19	Digital Output	Reserved
6	Digital Output	Ground (Alarm)	20	Digital Output	Read Wet Mode
7	Digital Output	General Alarm	21	Digital Output	Read Overflow
8	Digital Output	Ch 1 Conc Alarm	22	Digital Output	Read NO Mode
9	Digital Output	Ch 2 Conc Alarm	23	Digital Input	Set Wet Mode
10	Digital Output	Reserved	24	Digital Input	Set Overflow Mode
11	Digital Output	Reserved	25	Digital Input	Set NO Mode
12	Digital Input	Reserved	26	DI/DO	Spare
13	Digital Input	Reserved	27	DI/DO	Spare
14	Digital Input	Reserved	28	DI/DO	Spare

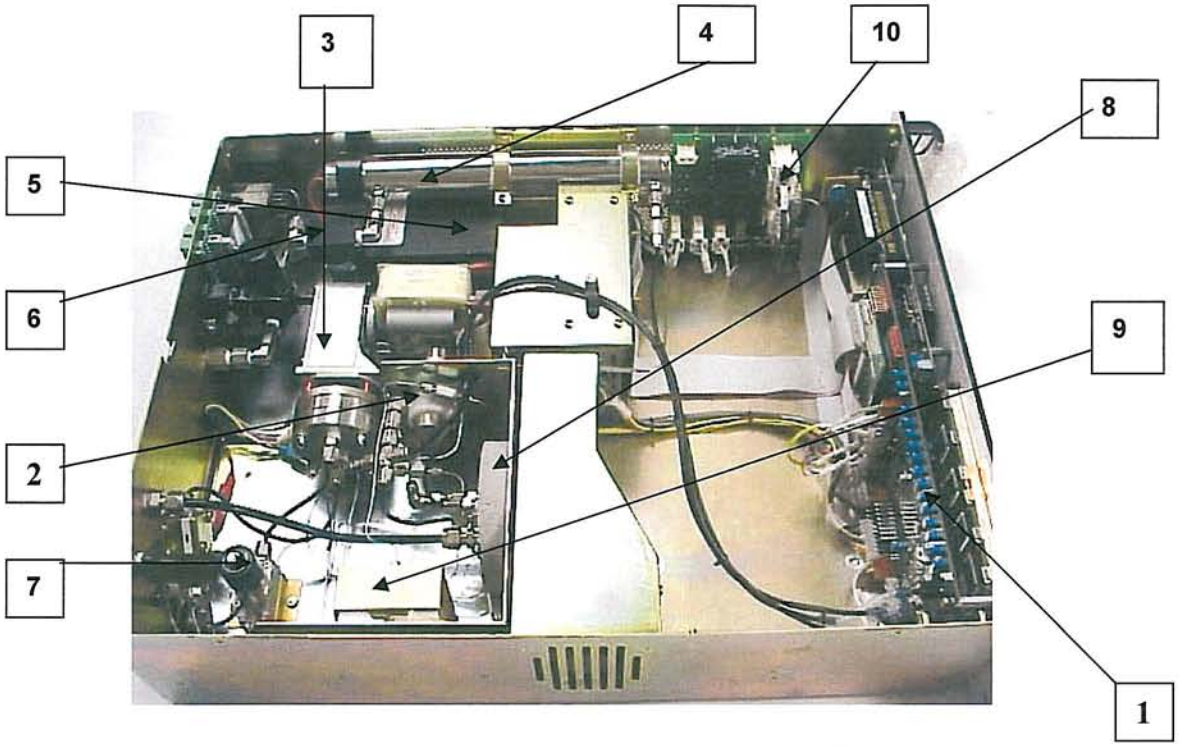
Digital Outputs – RS-232 (Standard 9 Pin DIN Connector)

Pin	Function
1	DCD Carrier Detect
2	RxD Receive Data
3	TxD Transmit Data
4	DTR Data Terminal Ready
5	Ground
6	DSR Data Set Ready
7	RTS Ready to Send
8	CTS Clear to Send
9	RI Ring Indicator

Digital Outputs – TCP/IP (8 Pin RJ-47 Connector)

Pin	Function
1	TDX+
2	TDX-
3	RXD+
4	Open
5	Open
6	RXD-
7	LNLED
8	LNLED

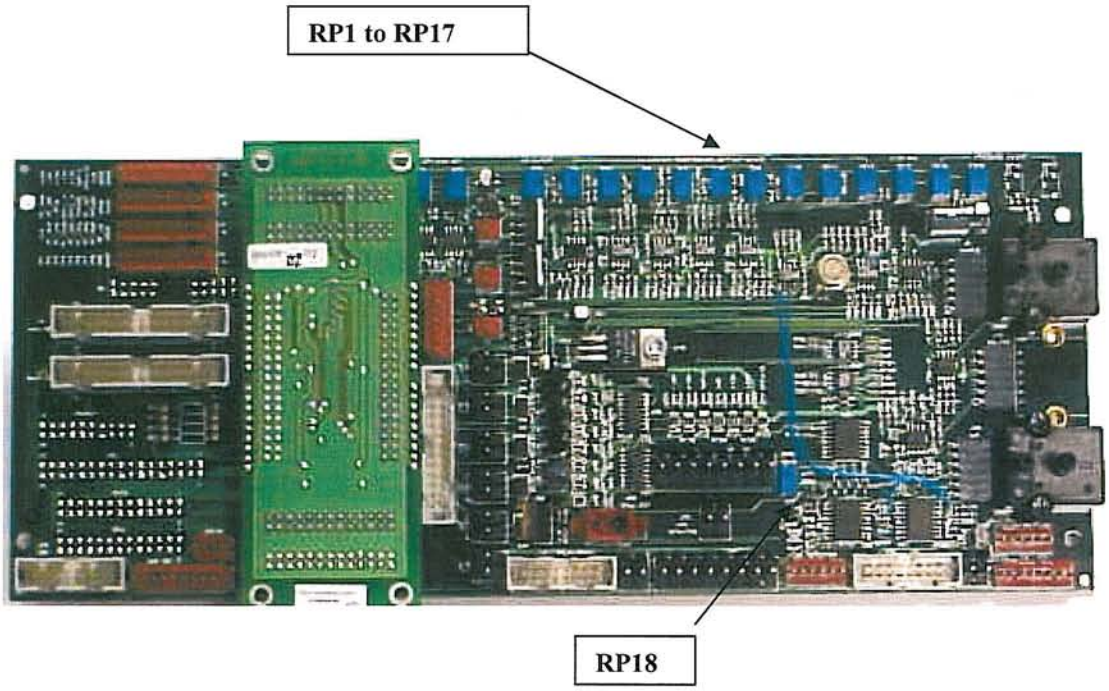
+ **IMPORTANT TIP:** For direct connect to a PC a crossover cable is required. Connection to a hub requires a straight cable. *Internal Component Locations*



Major Internal Components

1. **Electronics:** Includes instrument electronics. (See Main Electronic Board)
2. **NO/NOx Solenoid Valve:** Switches flow between the NO and NOx mode.
3. **Optional Internal Sample Pump:** Provides sample to analyzer.
4. **Ozonator:** Contains UV Lamp.
5. **Ozonator High Voltage Supply:** Produces High Voltage to UV lamp.
6. **Proportional Flow Pressure Regulator:** Regulates flow of ozone.
7. **Proportional Flow Pressure Regulator:** Regulates flow of sample.
9. **Reaction Chamber & Detector Assembly:** See Figure 8.
10. **NO/NOx Converter**: Converts NO2 to NO for total NOx
11. **Relay Control Board:** Provides AC Voltage to Heaters, Pump and UV Transformer.

Main Electronics Board (Potentiometers)

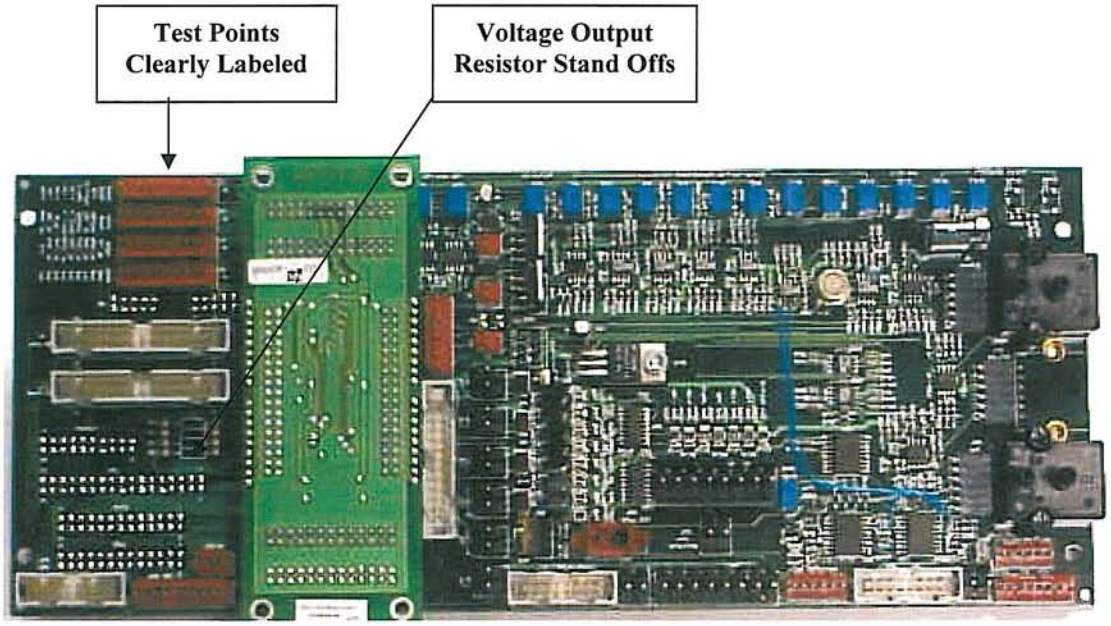


Main Electronic Board Potentiometers

RP1	: EPC 9.5V Sample Set	**RP10**	: Chiller Zero Temp Set
RP2	: EPC 9.5V Air Set	**RP11**	: Chiller Span Temp Set
RP3	: O3 Cutoff	**RP12**	: Chiller Temp Set
RP4	: Cell Temp Set	**RP13**	: 12VDC Adjust
RP5	: Oven Temp Set	**RP14**	: Sample Pressure Set
RP6	: Pump Temp Set	**RP15**	: Air Pressure Set
RP7	: Converter Temp Set	**RP16**	: Not Used
RP8	: O2 Temp Set	**RP17**	: Not Used
RP9	: NH3 Temp Set	**RP18**	: Coarse Zero Adjust

NOTE: Potentiometers are clearly labeled on both sides of the PCB.

Main Electronics Board (Connectors)



Main Electronic Board Connectors

J1 : Test Points
J3 : Test Points
J5 : Test Points
J7 : EPC Sample
J9 : Aux Back Panel
J11 : Diluter
J13 : Digital Input 2
J15 : Diluter Transducer
J17 : Digital Output 1
J19 : Aux Power
J21 : Sample Overflow Valve

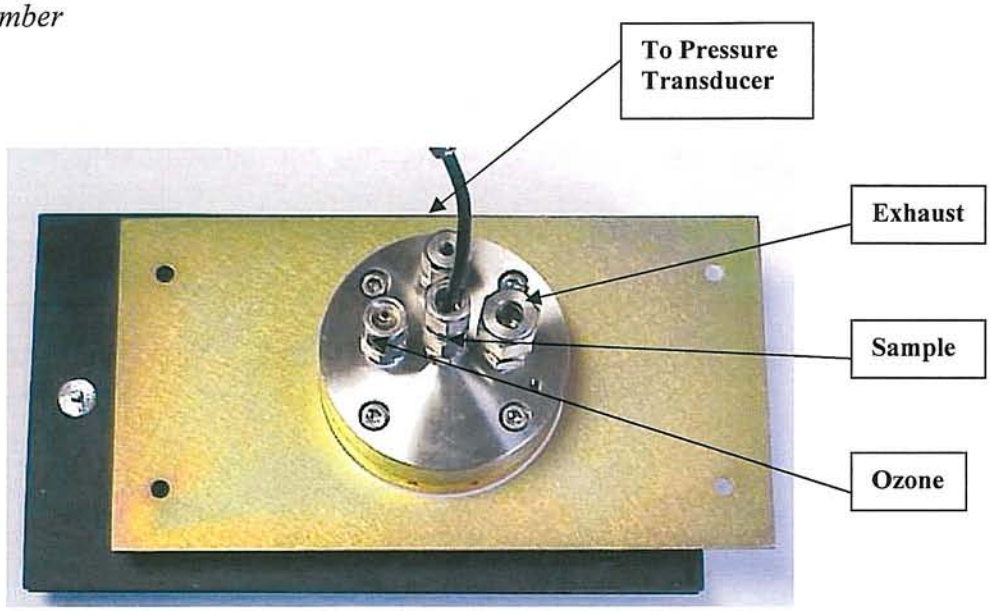
J23 : Wet/Dry Valve
J25 : + 5 Volt Detector
J27 : **C**hiller Temp Sense
J29 : Spare Digital Input

J31 : Fan Power
J33 : Chiller Power
J35 : Detector
J37 : **T**hermocouple
JP1 : PGA Zero

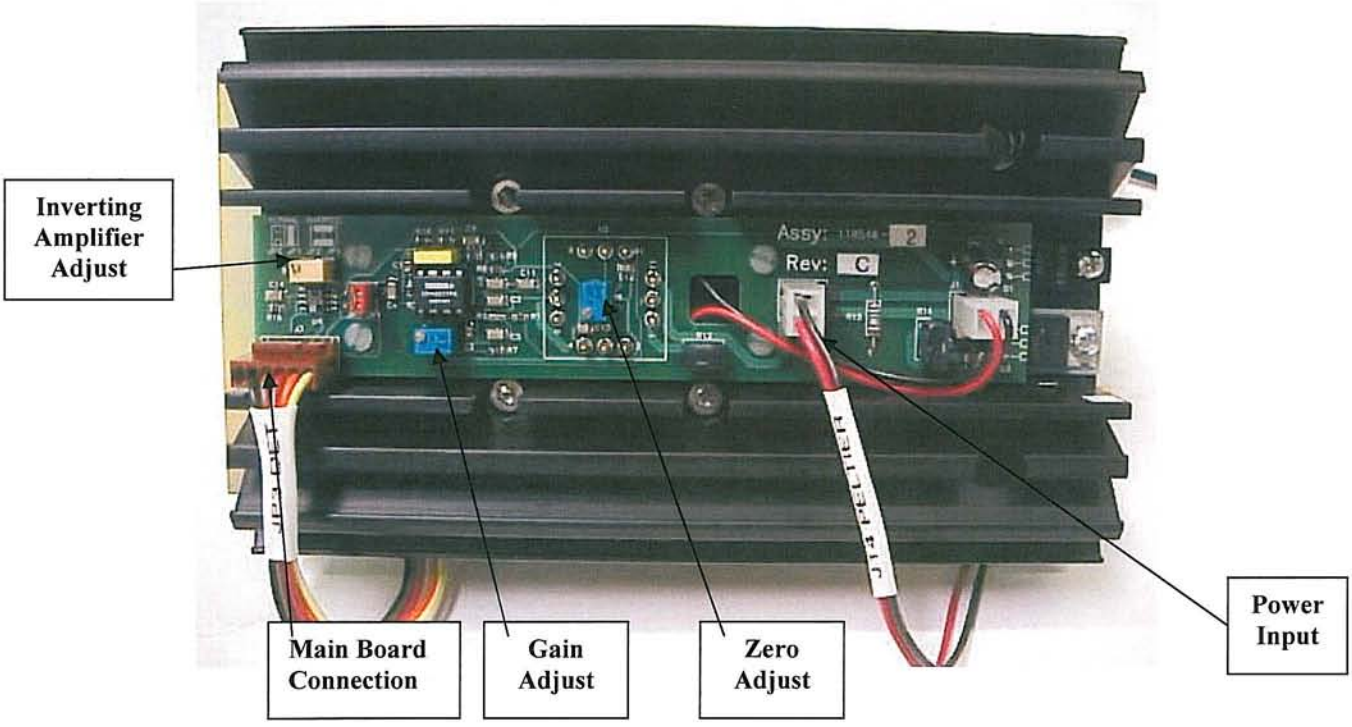
J2 : Test Points
J4 : EPC Air Valve
J6 : Digital Output 2 (DIDO Board)
J8 : Sample Transducer
J10 : Spare Digital Output
J12 : Main Back Panel
J14 : NO/NOx Valve
J16 : Span Valve
J18 : Zero
J20 : Air Transducer
J22 : Daisy Chain Input 1 (DIDO Board)
J24 : Chiller Out
J26 : Spare Analog Input
J28 : Spare Back Panel
J30 : Daisy Chain Output (DIDO Board)
J32 : Relay Board
J34 : Power
J36 : O2 Detector
J38 : RTD

NOTE: Connections are clearly labeled on the PCB

Reaction Chamber

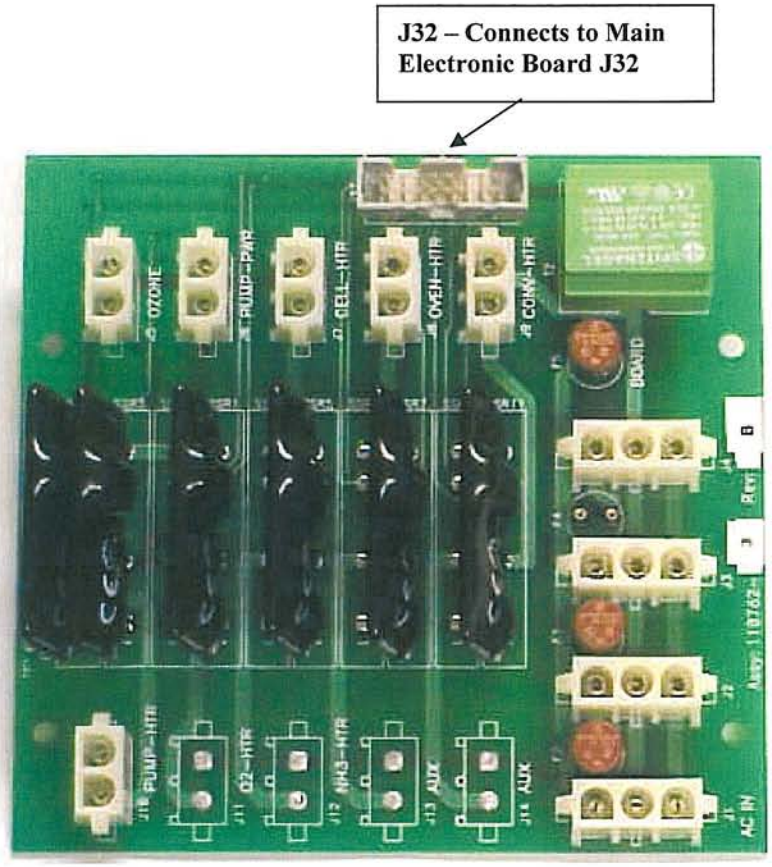


Reaction Chamber Assembly (Oven Side)



Reaction Chamber Pre-Amplifier

Relay Board Connections



Relay Board Connections

J1 : AC Input
J3 : **Power Supply 2**
J5 : Ozone Lamp
J7 : Cell Heater
J9 : Converter Heater
J11 : Optional O2 Heater
J13 : **Aux**

J2 : Power Supply 1
J4 : Power Supply 3
J6 : Pump Power
J8 : Oven Heater
J10 : Pump Heater
J12 : Optional NH3 Heater
J14 : Aux

Section IV

Troubleshooting

TROUBLESHOOTING FOR 600 ANALYZERS

POWER DISTRIBUTION

PROBLEM: LCD Display Not Illuminating

- ✓ Check if Backlight is Turned Off
- ✓ Press Lightbulb on Keypad
- ✓ Make Sure Switch is "on"
- ✓ Make Sure Power Cord is Connected
- ✓ Check Power Input Fuse (replace if necessary)
- ✓ Remove Lid to See if GREEN LED's on Main Board are Lit.

GREEN LED'S ARE OUT:

- ✓ Check AC Input to Power Supply (black & white wires)
- ✓ If No Voltage
  - o Check Fuse on Power Relay Board (replace if necessary)

GREEN LED'S ARE STILL OUT:

- ✓ Check Test Points for DC Output from Power Supply
- ✓ IF No Voltage
  - o Likely a short on one of PCB's

IF SHORT TO PCB:

- ✓ Turn Power Off
- ✓ Disconnect Power Input Cable to Main PCB
- ✓ Turn Power On
- ✓ Check Power Input Cable for Respective Voltages (see chart A)

POWER DISTRIBUTION

NO DC POWER:

- ✓ Turn Off Power
- ✓ Replace Fuse on Respective Power Supply (if blown)
- ✓ Turn Power On
- ✓ Check Power Input Cable for DC Voltages

STILL NO DC POWER:

- ✓ Replace Power Supply

STILL NO DC POWER:

There is a short on Analyzer, Microprocessor or Microprocessor Interface Board.

- o Turn Power Off
- o Remove All Satellite Boards to the Rear of Main Board
- o Remove All Connectors at the Rear of Main Board
- o Reconnect Power Input Cable
- o Turn Power On

GREEN LED's ARE ON:

There is a Failure on the Satellite Boards or Connected Devices

LCD Should Be Lit and the Program Running

- o Turn Power Off
- o Replace One by One the Removed Items starting with the Satellite Boards
- o Replace a Removed Item
- o Turn Power On
- o Check to see if GREEN LED's are Illuminated
  - ✓ If LED's Do Not Light—there is a short on that item
  - ✓ Replace or Debug at Component Level

FRONT END ELECTRONICS

PROBLEM: LCD Display Not Illuminating

- ✓ Check if Backlight is Turned Off
- ✓ Press Lightbulb on Keypad
- ✓ Make Sure Switch is "on"
- ✓ Make Sure Power Cord is Connected
- ✓ Check Power Input Fuse (replace if necessary)
- ✓ Remove Lid to See if GREEN LED's on Main Board are Lit.

GREEN LED'S ARE OUT:

- ✓ Check AC Input to Power Supply (black & white wires)
- ✓ If No Voltage
  - o Check Fuse on Power Relay Board (replace if necessary)

GREEN LED'S ARE STILL OUT:

- ✓ Check Test Points for DC Output from Power Supply
- ✓ IF No Voltage
  - o Likely a short on one of PCB's

IF SHORT TO PCB:

- ✓ Turn Power Off
- ✓ Disconnect Power Input Cable to Main PCB
- ✓ Turn Power On
- ✓ Check Power Input Cable for Respective Voltages (see chart A)

FRONT END ELECTRONICS

GREEN LED'S ARE STILL OUT:

There is a short on the Main Board, the Microinterface or the Microprocessor.

- ✓ Turn Power Off
- ✓ Remove Main Board (leave Power Input Cable Connected)
- ✓ Make Sure No Shorts Can Occur
- ✓ Turn Power On.

GREEN LED's ARE STILL OUT:

There is a short to the Main Board

- ✓ Replace or Debug at Component Level

GREEN LED's ARE ILLUMINATED:

There is a failure of the Microprocessor or Microprocessor Interface Board.

CALL CAI.

PRESSURE & TEMPERATURE

AIR PRESSURE

- ✓ Check Alarm Screens For Acceptable Min/Max Values
- ✓ Compare to the Factory Alarm Settings
  - o Correct as Necessary

Using F3-Diagnostics—

- ✓ Note Air Pressure
- ✓ Note Flow
- ✓ Note EPC Voltage

AIR EPC VOLTS ARE HIGH:

- ✓ Insufficient Air Supply
- ✓ Check rear of Analyzer for Air Supply
  - o Correct as Necessary

AIR EPC VOLTS ARE STILL HIGH:

- ✓ Remove Lid
- ✓ Turn Air Off
- ✓ Disconnect Ozonator Power Connector from Relay Board (Prevents Ozone Production)
- ✓ Locate Air Pressure Regulator and EPC Valve
- ✓ Connect a Pressure Gauge Between Regulator and EPC
- ✓ Turn Air On
  - o EPC Should Read 20-25 psi
- ✓ If Pressure is Low
  - o Adjust Pressure Regulator (clockwise to increase)
  - o If Pressure is Not Adjustable
    - ✓ Blockage into the Regulator or a Faulty Regulator
      - Unblock or Replace Regulator

PRESSURE & TEMPERATURE

AIR PRESSURE (cont)

- ✓ If EPC Inlet Pressure is Correct
  - o EPC Valve, Tubing, Pressure Transducer, or Associated Electronics are Faulty
- ✓ Turn Air Off
  - o Note Air Pressure (should be 0+-.2 psi)
  - o If Not Correct
    - ✓ Debug the Pressure Measurement Circuit at Board Level
    - ✓ Replace Transducer or Main Board
- ✓ Turn Air On
  - o Check Tubing from EPC to Ozonator
  - o Note the Diagnostic Air Pressure
    - ✓ If Pressure Increases Slightly or None
      - Voltage to EPC is Not Connected
      - EPC Coil has Failed
      - Or EPC is Blocked
- ✓ Disconnect EPC Outlet Tubing at the EPC
  - o Check Flow & Pressure
    - ✓ Gauge Connected to EPC Outlet Should Show same as Inlet Pressure Measured in D.
  - o If No Pressure/Flow
    - ✓ Check Voltage on EPC Valve Connector
    - ✓ If not 15 Volts
      - Check Integrity of Wire Back to Main Board
  - o If No Pressure/Flow
    - ✓ Disconnect EPC Coil Wires
    - ✓ Check for Open Coil Circuit on EPC Valve
    - ✓ If Open Circuit
      - Replace EPC Valve

PRESSURE & TEMPERATURE

AIR PRESSURE (cont)

- ✓ Clean EPC Valve
- ✓ Reconnect to Ozonator Power and Replace Lid.

AIR EPC VOLTS ARE LOW:

- ✓ Insufficient Air Supply
- ✓ Check Rear of Analyzer for Air Supply (<1000psi)
  - o Correct as Necessary

AIR EPC VOLTS ARE STILL LOW:

- ✓ Remove Lid
- ✓ Turn Air Off
- ✓ Disconnect Ozonator Power Connector from Relay Board (Prevents Ozone Production)
- ✓ Locate Air Pressure Regulator and EPC Valve
- ✓ Connect a Pressure Gauge Between Regulator and EPC
- ✓ Turn Air On
- ✓ EPC Should Read 20-25 psi
- ✓ If Inlet pressure is High
  - o Adjust Pressure Regulator (counter-clockwise to decrease)
  - o If Pressure is Not Adjustable
    - ✓ Blockage into the Regulator or a Faulty Regulator
      - ✓ Unblock or Replace Regulator

PRESSURE & TEMPERATURE

AIR PRESSURE (cont)

- ✓ If EPC Inlet Pressure is Correct
  - o Blocked Capillary, EPC Valve, Tubing, Pressure Transducer, or Associated Electronics are Faulty
- ✓ Note the Diagnostic Air EPC Volts
  - o Disconnect the Tubing to Ozone Capillary
  - o If Air EPC Volts Increase to Normal or High
    - ✓ Ozone Capillary is Blocked
      - • Unblock capillary or Replace
- ✓ Disconnect Air EPC Electrical Connector
  - o Check Diagnostic Air Pressure
    - ✓ If Greater than 10 psi
      - • EPC Valve is Not Closing
        - ✓ Replace or Clean
- ✓ Turn Air Off
- ✓ Note Diagnostic Air Pressure
  - o If Not 0+-.2 psi
    - ✓ Debug Pressure Measurement Circuit at Board Level, Replace Transducer or Main Board
- ✓ After Fixing the Problem
- ✓ Reconnect the Ozonator Power
- ✓ Replace Lid

PRESSURE & TEMPERATURE

SAMPLE PRESSURE (cont):

- ✓ Check Alarm Screens for Acceptable Min/max Values
- ✓ Compare to the Factory Alarm settings
  - o Correct as Necessary

Using F3 Diagnostics--

- ✓ Note Sample Pressure
- ✓ Note Flow
- ✓ Note EPC Voltage

SAMPLE EPC VOLTS ARE HIGH:

- ✓ Insufficient Sample Supply
- ✓ Check Inlet Filter for Blockage
- ✓ Check Converter (if in NOX Mode)
  - o Switch to NO Mode
- ✓ Check Rear of Analyzer for Sample Supply
  - o Correct as Necessary

EPC VOLTS ARE STILL HIGH:

- ✓ Replace Sample Inlet Filter
- ✓ Converter is Blocked (NOx Mode)
  - o Repair or Replace Converter

EPC VOLTS ARE STILL HIGH:

- ✓ Remove Lid
- ✓ Locate Sample Filter and EPC Valve
  - o Connect Pressure Gauge Between Regulator and EPC
- ✓ With Sample ON
  - o Inlet Pressure Should Read above 6psi
- ✓ If EPC Inlet Pressure is Low
  - o Blockage in Sample Filter or Tubing to EPC

PRESSURE & TEMPERATURE

SAMPLE PRESSURE (cont):

- ✓ If EPC Inlet Pressure is Correct
  - o EPC Valve , NO/Nox 3 way Valve, Tubing, Pressure Transducer or Associated Electronics are Faulty

TURN SAMPLE OFF:

- ✓ Note Diagnostic Air Pressure (should be 0+- .2 psi)
- ✓ If Not Correct
  - o Debug Pressure Measurement Circuit at Board Level
    - ✓ Replace Transducer or Main Board

TURN SAMPLE ON:

- ✓ Check Tubing from EPC to Converter and 3 Way Valve
  - o Not Leaking
  - o Note Diagnostic Sample Pressure
  - o If Pressure Increase Slightly or None
    - ✓ Voltage to EPC is Not Connected
    - ✓ EPC Coil Failure
    - ✓ Or EPC Blocked
- ✓ Disconnect EPC Outlet Tubing at EPC
  - o Check Flow/Pressure
    - ✓ Gauge Connected to EPC Outlet Should Show Same as Inlet Pressure Measured Above
  - o If No Pressure/Flow
    - ✓ Check Voltage on EPC Valve Connector
    - ✓ If Not 15 Volts
      - Check Integrity of Wire Back to Main Board

PRESSURE & TEMPERATURE

SAMPLE PRESSURE (cont):

- If No Pressure/ Flow
  - ✓ Disconnect EPC Coil Wires
  - ✓ Check for Open Coil Circuit on EPC Valve
  - ✓ If Open Circuit
    - Replace EPC Valve
  - ✓ Clean EPC Valve
  - ✓ Replace EPC Valve
  - ✓ Replace Lid

AIR EPC VOLTS ARE LOW:

- ✓ Pressure at Sample Inlet is Too High
- ✓ Check Rear of Analyzer for Sample Supply (should be less than 30 psi)
  - Correct as Necessary.

AIR EPC VOLTS STILL LOW:

- ✓ Remove Lid

EPC INLET PRESSURE IS CORRECT:

- ✓ Blocked Capillary in EPC Valve, Tubing Pressure Transducer or Associated Electronics
- ✓ Note Diagnostic Sample EPC Volts
  - Disconnect Tubing to Sample Capillary
- ✓ Sample Diagnostic Volts Increase to Normal or High
  - Capillary is Blocked
    - ✓ Unblock or Replace Sample Capillary
- ✓ Disconnect Sample EPC Electrical Connector
- ✓ Check Diagnostic Sample Pressure
  - Greater than 2 psi
    - ✓ EPC Valve is Not Closing
      - Replace or Clean

PRESSURE & TEMPERATURE

SAMPLE PRESSURE (cont):

- ✓ Turn Sample Off
  - o Note Diagnostic Sample Pressure (0+-.2psi)
- ✓ If Not Correct
  - o Debug Pressure Measurement Circuit at Board Level

✓ Replace Transducer

✓ Replace Main Board

- ✓ Replace Lid

PRESSURE & TEMPERATURE

DIODE TEMPERATURE:

- ✓ Check Alarm Screens for Acceptable min/Max Values
- ✓ Compare to Factory Alarm Settings
  - o Correct as Necessary
- ✓ Using F3 Diagnostics
  - o Diode Temperature Voltage Increases w/Decrease in Temperature

DIODE TEMPERATURE IS LOW:

- ✓ Temperature Environment below 5 degree C
- ✓ Remove Lid
- ✓ Check Voltage on Pin 6 of Detector Board to Main Board Connector
  - o Normally 0.7-0.9 Volts
- ✓ If Voltage is Incorrect
  - o Debug or Replace Detector Board
- ✓ If Voltage Correct
  - o Debug or Replace Main Board

DIODE TEMPERATURE IS HIGH:

- ✓ Temperature Environment Above 40 degree C
- ✓ Remove Lid
- ✓ If Fans Not Running
  - o Check 24vds to Fan and Replace Fan
- ✓ Check Voltage on Pin 6 of Detector Board to Main Board Connector
  - o Normally 0.7-0.9 Volts
- ✓ If Voltage Incorrect
  - o Debug or Replace Detector Board
- ✓ If Voltage Correct
  - o Debug or Replace Main Board

PRESSURE & TEMPERATURE

ALL OTHER TEMPERATURES:

- ✓ Check Alarm Screens for Acceptable Min/Max Values
- ✓ Compare to Factory Alarm settings
  - o Correct as Necessary
- ✓ Using F3 Diagnostics
  - o Power Up Analyzer for at Least 1 Hour
  - o Note Temperature of the Component in Alarm
  - o If Temp is Only 1-2 Deg C Outside Limit and Stable
    - No Affect to Performance
    - Change Alarm Limit to Match
  - o Temperature Voltages Increase w/Increase in Temperature

TEMPERATURE IS LOW:

- ✓ Remove Lid
- ✓ Red LED's are On or Flashing
  - o No
    - Check TMP12v Test Point
    - Debug or replace Main Board
  - o If TMP12V Good
    - Check 60Hz Signal on Test Point
    - Voltage Should be approx. 6 vac
    - Check Wiring from relay Board to the Main Board
  - o If Wiring Good
    - Debug Transformer Circuit on relay Board
    - If Good
      - ✓ Debug the Flip Flop and Drive Circuit on Main Board

PRESSURE & TEMPERATURE

ALL OTHER TEMPERATURES (cont):

- ✓ If Alarmed Channel LED On Continuously
  - o Faulty Heater or Control Circuit
  - o Disconnect Heater Element from Relay Board
    - Check for Open Circuit
    - Replace as Necessary
- ✓ If Alarmed Channel LED Off
  - o Faulty RTD or Control Circuit
  - o Disconnect RTD Connector from the Main Board
  - o Check RTD Resistance
  - o If RTD Element is Open Circuit
    - Replace as Necessary
- ✓ If Heater & RTD Good
  - o Debug or Replace Main Board

TEMPERATURE IS HIGH:

- ✓ Remove Lid
- ✓ Red LED's are On or Flashing
  - o No
    - Check TMP12v Test Point
    - Debug or Replace Main Board
  - o If TMP12v Good
    - Check 60Hz Signal on Test Point
      - ✓ Voltage Should be approx 6 vac
    - Check Wiring from Relay Board to Main Board

PRESSURE & TEMPERATURE

ALL OTHER TEMPERATURES (cont):

- If Wiring Good
  - Debug Transformer Circuit on Relay Board
  - If Good
    - ✓ Debug Flip Flop and Drive Circuit on Main Board
    - ✓ If Alarmed Channel LED on Continuously
      - Faulty RTD or Control Circuit
    - ✓ Disconnect RTD Connector from Main Board (LED should go off)
    - ✓ Check RTD Resistance
      - If RTD Element is Low Resistance
        - Replace as Necessary
    - ✓ If Alarmed Channel LED Off
      - Faulty Heater Drive Circuit
      - Check Solid State Relay for Short Circuit
        - Replace as Necessary

TROUBLESHOOTING FOR 600 ANALYZERS

LINEARITY

Ensure NO Pressure or Temperature Alarms

Check Certified Concentrations of New Cylinders by Cross Referencing to the Gas In Use Before Putting Into Service

- ✓ Check Linearity of Coefficients (F5, F6 and F1)
  - o Correct as Necessary
- ✓ Low Concentration of Gas Results are High
  - o Lack Of Ozone
    - ▪ See "Troubleshooting for Ozonator"
  - o Not Lack Of Ozone
  - o Low Concentration of Gas Results are Low
    - ▪ Check sample and Air Flow rates
    - ▪ Contamination of Reaction Cell or Cell Window
  - o Check sample and Air flow Rates
- ✓ Clean or Replace Capillary
- ✓ Check for Contamination on cell Window and Reaction Chamber
  - ▪ Turn Gases Off
  - ▪ Turn Power Off
  - ▪ Inspect the Filter
    - • If Contaminated
      - o Separate Filter from O Ring
  - ▪ Inspect Reaction Chamber
  - ▪ Clean Filter and Chamber w/Isopropyl Alcohol and Q-tip.
- ✓ Rebuild and Recheck Linearity

ZERO GAS CONTAMINATION CAN CAUSE ERRORS THAT APPEAR AS LINEARITY ERRORS.

TROUBLESHOOTING FOR 600 ANALYZERS

CALIBRATION or CONCENTRATION ALARMS

CONCENTRATION ALARMS:

There are 2 Alarms (low & high) each can be configured for both concentration and direction

Alarms Set to Zero Means They Are Disabled

- ✓ If Zero Used when an Alarm was Present
  - Reset Alarm
    - Power Down
    - Press Up
- ✓ Negative Value Sets the Alarm as a Lower Than Concentration Alarm
- ✓ Positive Value Sets the Alarm as Higher Than Concentration Alarm

CALIBRATION ALARMS:

- ✓ Displaying of Calibration Alarms
  - End of Auto Cal Procedure (Cannot Calibrate)
  - Continuously Displaying Uncalibrated Ranges
  - Acceptable Deviations (user Definable)
    - Absolute (theoretical Concentration)
    - Relative (from last Calibration)
  - Stores and Verifies Deviations
    - Accessed via Menu Options (refer to Manual)

TROUBLESHOOTING FOR 600 ANALYZERS

CALIBRATION or CONCENTRATION ALARMS

FIRST DETERMINE IF THE ALARM WAS CAUSED AT THE ZERO POINT OR THE SPAN POINT BY USING THE DEVIATIONS SCREEN.

ZERO ALARM:

- ✓ Check That Correct Zero Gas Flows When Zero Selected
  - o Correct if Necessary
- ✓ Using F5, F6 and F2(Display Raw Value) w/Zero Gas Flowing
  - o Check and Note Raw Value for all Used Ranges
  - o Raw Value Should be approx 1.0 Volts
  - o If Adjustment is Needed
    - ▪ Remove Lid
    - ▪ Adjust Zero Potentiometer on Detector Board
      - • Use of Raw Volts Eliminates Any Polynomial Coefficients used by Software

SPAN ALARM:

- ✓ Check That Correct Span Gas Flows when Span Selected
  - o Correct If Necessary
- ✓ Check Correct Span Gas Concentration is Entered for Range
  - o F5,F1-Span Gas Settings
- ✓ Check Correct Linear Coefficients
  - o F5,F6 and F1 to Change Lin Coefficients
    - ▪ Correct if Necessary

TROUBLESHOOTING FOR 600 ANALYZERS

CALIBRATION or CONCENTRATION ALARMS

SPAN ALARM (CONT):

- ✓ Using F5, F6 and F2 (Display raw Value) w/Span Gas Flowing
  - o Check and Note Lin Value
  - o Displayed Value is High
    - ▪ Adjustment needed
      - • Remove and Adjust Span Potentiometer on Detector Board
  - o Perform (2) Manual Span Calibrations
  - o Verify the Deviations are Within Set Limits
- ✓ If Displayed Value is LOW:
  - o Check Both Sample Flow and Ozone Output Before Making Gain Adjustments.
  - o If Low Concentration of Gas is Available
    - ▪ Check for Low Value
    - ▪ If Not
      - • Ozone Deficiency
    - ▪ Turn Ozonator Air Off
    - ▪ Turn Ozonator Off
    - ▪ Remove UV Ozone Lamp
    - ▪ Shake Mercury Away from Electrodes
    - ▪ Replace Ozone Lamp
    - ▪ Turn Ozonator On
    - ▪ Turn Air On
    - ▪ Allow Ozonator to Warm Up

TROUBLESHOOTING FOR 600 ANALYZERS

CALIBRATION or CONCENTRATION ALARMS

SPAN ALARM (cont):

- ✓ Displayed Value is STILL LOW
  - o Check Sample Flow Rate
  - o Turn Ozonator Off
  - o Connect Bubble Flow Meter to Analyzer Vent
  - o Flow Zero Gas
  - o Measure the Flow
  - o If Low compared to CAI Checkout Sheet
    - ▪ Sample Capillary is Blocked
    - ▪ Remove Capillary
      - • Clean or Replace
    - ▪ Recheck Flow
- ✓ Sample Flow Good
  - o Rebuild
  - o Allow Analyzer to warm Up
  - o Recheck Span reading
- ✓ Displayed Value is STILL LOW
  - o Adjustment Needed
    - ▪ Remove and Adjust Span Potentiometer on detector Board
    - ▪ Perform (2) Manual Span Calibrations
    - ▪ Verify the Deviations are Within Set Limits

FRONT END ELECTRONICS

CHART A

Primary Voltage	Wire Color	Connects To
+5	Blue	Microprocessor
+15	Violet	Analog Circuits
+24	Orange	Solenoid Valves & Fans
-15	Grey	Analog Circuits
Returns	Yellow	

FRONT END ELECTRONICS

FACTORY ALARM SETTINGS

Alarm	Setting	Min	Max
Cell Temp	66	65	68
Diode Temp	1.6	1.4	1.8
Converter Temp	205	204	208
Oven Temp	66/85/100	65/83/97	69/88/102
Pump Temp	66/85/100	65/83/97	95/102
Chiller Temp	4-7	2	8
O2 Temp	50	45	55
NH3 Conv Temp	405	395	420
Sample Pressure	3.85/0.9	3.8/0.85	3.9/0.95
Air Pressure	15	14	16
Sample EPC Volts	2-6	1	8
Air EPC Volts	2-5	1	8
Concentration Alarm		0	0

FRONT END ELECTRONICS

FACTORY ALARM SETTINGS

Alarm (CH1, CH2,or CH3	Setting	Min	Max
Concentration Alarm		0	0
Temperature		15 45 for O2	50 55 for O2
EPC Valve		2	8
Flow 1	1	0.10	2.2 0.25 for O2
Flow 2	1	0.10	2.2 0.25 for O2
Flow 3	1	0.10	2.2 0.25 for O2
Ext Analog 1		-1	10
Ext Analog 2		-1	10
Pressure	14.67 (Barometer)	13	16
Temperature	Case Temp	15	50

FRONT END ELECTRONICS

FACTORY ALARM SETTINGS

Standard Low & High Concentration Value Positive

- ✓ Concentration > Low Level
  - o Low Alarm
- ✓ Concentration > High Level
  - o High Alarm

Low Alarm With Negative Value:

- ✓ Concentration < Low Level
  - o Low Alarm
- ✓ Concentration > High Level
  - o High Alarm

High Alarm With Negative Value:

- ✓ Concentration > Low Level
  - o Low Alarm
- ✓ Concentration < High Level
  - o High Alarm

Low and High With Negative Values:

- ✓ Concentration < Low Level
  - o Low Alarm
- ✓ Concentration > High Level
  - o High Alarm

FRONT END ELECTRONICS

CHECK OUT PROCEDURE FOR DETECTOR BOARD

- ✓ Determine if the Circuit board is Set Up for the Correct Configuration for the Application
- ✓ Adjust the PGA Zero, so That Changing the PGA Gain Does Not Cause Zero Error in the PGA Output
- ✓ Adjust the Zero and Span as Needed by the Instrument

CIRCUIT BOARD CONFIGURATIONS:

+5VDC TEC Power Supply Input:

- ✓ Install 18 Gauge Jumper Wire into JP6
- ✓ Power Up the Circuit With +5VDC (+/- 0.50V) at J2

+7.5 to 18VDC Power Supply Input:

- ✓ Check for +5VDC power at J7 pin 1
- ✓ Remove Any Jumper from JP6 or 7
- ✓ Power Up Circuit
- ✓ Measure Voltage Between Ground (TP8) and JP7 pin 1.
  - o Should be 5VDC (=/- 0.50 volt)
- ✓ Correct voltage at JP7
  - o Power Off Circuit
  - o Install 18 Gauge Jumper Wire at JP7
    - ▪ Only one 18 Gauge Jumper Wire Should be Installed in Circuit Board for any Given Configuration

TEC Voltage	5VDC +/- 0.50V	7.5 to 18VDC
Install Jumper in J6	Yes	No
Install Jumper in J7	No	Yes

FRONT END ELECTRONICS

CHECK OUT PROCEDURE FOR DETECTOR BOARD

- ✓ Determine if the Circuit board is Set Up for the Correct Configuration for the Application
- ✓ Adjust the PGA Zero, so That Changing the PGA Gain Does Not Cause Zero Error in the PGA Output
- ✓ Adjust the Zero and Span as Needed by the Instrument

OUTPUT (+ or -)

Final Output Can be set as Positive Going or Negative Going Output.

Negative Going Output:

- ✓ Connect Jumper in Both JP4 and 5 Across pins 1 and 2

Positive Going Output:

- ✓ Connect Jumper in Both JP4 and 5 Across pins 2 and 3

FRONT END ELECTRONICS

CHECK OUT PROCEDURE FOR DETECTOR BOARD

- ✓ Determine if the Circuit board is Set Up for the Correct Configuration for the Application
- ✓ Adjust the PGA Zero, so That Changing the PGA Gain Does Not Cause Zero Error in the PGA Output
- ✓ Adjust the Zero and Span as Needed by the Instrument

PGA ZERO:

- ✓ Turn Circuit Power Off
- ✓ Remove or Disengage JP4
- ✓ Establish Connection on JP5 Between pins 1 and 2 or pins 2 and 3
- ✓ Switch JP3 to On
- ✓ Power Up Circuit
- ✓ Measure Between Ground (TP8) and PGA Output (TP2)
- ✓ Switch Gain of PGA to Lowest Gain
    - o Connect Across pins 1 and 2 on JP1 and JP2
        - ▪ Note the Reading at JP2.
    - o Achieve Highest Gain for PGA
        - ▪ Remove Connection Between pins 1 and 2 of both JP1 and JP2
    - o When Changing Gain of PGA
        - ▪ Adjust RP3 so that No Change in Output (+/-0.00mV) can be Measured at TP2
- ✓ Power the circuit Back Off
- ✓ Set JP3 Back to Off
- ✓ Set Jumper JP4 and JP5 Back to Valid Configuration

FRONT END ELECTRONICS

CHECK OUT PROCEDURE FOR DETECTOR BOARD

- ✓ Determine if the Circuit board is Set Up for the Correct Configuration for the Application
- ✓ Adjust the PGA Zero, so That Changing the PGA Gain Does Not Cause Zero Error in the PGA Output
- ✓ Adjust the Zero and Span as Needed by the Instrument

ZERO & SPAN:

- ✓ Set Zero for Final Output
  - o Adjust RPI
- ✓ Set Span For final Output
  - o Adjust RP2
- ✓ Set Gain of PGA (as needed)
  - o Setting up Logic at JP1 & JP2.

CIRCUIT BOARD TEST POINTS:

Test Pt	Signal
TP1	Final Output
TP2	PGA out
TP3	Photodiode Out
TP4	Thermistor Voltage
TP5	TEC Error Voltage
TP6	+2.048V
TP7	=2.048V
TP8	Ground

PGA GAIN SETTINGS:

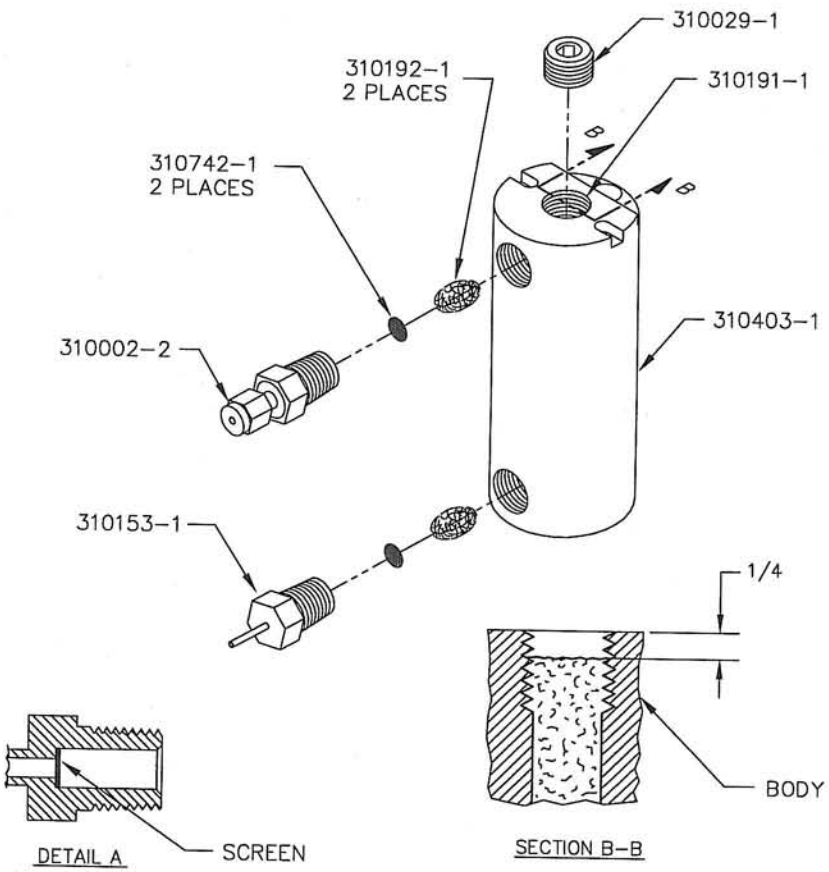
	JP1	JP2
Gain	A1	A0
1	O	0
2	O	1
4	1	0
8	1	1

*0=Jumper
1=No Jumper

Section V

Component Service/Replacement

1. Replacing NOx Converter Material



REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
A	CHANGE DESCRIPTION AND ADD -1 TO PART NO'S. REV NOTES, ADD DET A, SEC B-B & NOTE 6 & 7		2-12-02	G. D.
B	ADDED ADDITIONAL NOTES TO NOTES 6 AND 7, SECTION B-B, CATALYST WAS: 1/8.	MD	1-2-07	GD

1. INSTALL 1/4" TEFLON TAPE TO PIPE THREADS OF MALE CONNECTOR 310002-2, MALE TUBE ADAPTER 310153-1 AND HEX PIPE PLUG 310029-1.
2. INSTALL SCREENS 310742-1 INTO MALE CONNECTOR 310002-2 AND MALE TUBE ADAPTER 310153-1.
   NOTE: USE 3/16" PIN PUNCH TO INSTALL SCREENS INTO HOLE IN PIPE THREAD END OF FITTINGS. PUSH SCREEN UNTIL IT SEATS AGAINST LIP IN BOTTOM OF FITTING (SEE DETAIL "A").
3. INSTALL GLASS WOOL 310192-1 INTO MALE CONNECTOR 310002-2 AND MALE TUBE ADAPTER 310153-1.
   NOTE: USE ENOUGH GLASS WOOL TO COMPLETELY FILL BACK OF THE FITTINGS. DO NOT PACK GLASS WOOL TIGHTLY.
4. INSTALL MALE TUBE ADAPTER 310153-1 INTO LOWER 1/8 NPT HOLE ON SIDE OF CONVERTER BODY 310403-1.
5. INSTALL MALE CONNECTOR 310002-2 INTO UPPER 1/8 NPT HOLE ON SIDE OF CONVERTER BODY 310403-1.
6. INSTALL CATALYST 310191-1 INTO CONVERTER BODY. FILL TO APPROX. 1/4" FROM TOP OF BODY (SEE SECTION "B-B").
   NOTE: TAMP CONVERTER CATALYST LIGHTLY WHILE FILLING BY TAPPING SIDE OF CONVERTOR BODY WITH SCREWDRIVER HANDLE. DO NOT PACK TIGHTLY.
7. INSTALL HEX PIPE PLUG 310029-1 INTO 1/8 NPT HOLE ON TOP OF CONVERTER BODY.
   NOTE: DO NOT CRUSH CONVERTER CATALYST WHEN INSTALLING HEX PLUG AS THIS COULD CAUSE THE NOX CONVERTER TO MALFUNCTION.

NOTES: UNLESS OTHERWISE SPECIFIED.

QTY REQD		PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
2		310742-1	SCREEN, CONVERTER/CUTTER		7
1		310403-1	BODY, CUTTER MHFID		6
A/R		310192-1	WOOL GLASS		5
6 GRAM		310191-1	CATALYST, NOX CONVERTER SPHERICAL		4
1		310153-1	TUBE ADAPT, MALE SS 1/16- 1/8 NPT		3
1		310029-1	PLUG, PIPE HEX HOLLOW SS 1/8 NPT		2
1		310002-2	CONN, MALE SS 1/16T-1/8 NPT		1

PART LIST

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR HEREWITH IS NOT TO BE REPRODUCED, USED, OR DISCLOSED IN WHOLE OR IN PART TO ANYONE WITHOUT THE WRITTEN PERMISSION OF CALIFORNIA ANALYTICAL INSTRUMENTS.

USED ON

APPROVALS	DATE
DRAWN G. GRISETA	2-21-01
CHECKED G. DEMINT	2-21-01
ISSUED	

CAI

ASSY CONVERTER NOX, 400-CLD

SIZE B | FSCM NO. | DWG. NO. 110378-1 | REV. B

SCALE - | SHEET 1 OF 1

2. Changing Sample Pump Diaphragm and Valve Plate

MODEL #NMP 830KT

POINTS OF INTEREST:

- The pump must not start against pressure or vacuum. When it is switched on, the pressure in the suction and pressure lines must be atmospheric
- The maximum permissible operating pressure (see type plate or data sheet) must not be exceeded. **EXCEPTION:** If the data sheet includes valves for intermittent operation, they may be employed briefly.
- To prevent the maximum permissible operating pressure being exceeded, restriction or control of the air or gas flow should only be carried out in the suction line.
- If restriction or control of the air or gas flow is made on the pressure side, ensure that the maximum permissible operating pressure is not exceeded.
- When the pump is at a standstill the inlet and exhaust must be at normal atmospheric pressure.
- Diaphragm and valve plate(s) are the only parts subject to wear. Wear is usually indicated by a drastic reduction in the pneumatic performance. When replacing parts proceed as described in section 4

SECTION 4:

SERVICING:

- Before working on the pump isolate the power supply securely, then check that the lines are not live
- Always change valve plate(s), diaphragm, and O-rings (if existing) at the same time.

CHANGING THE DIAPHRAGM
PARTS REQUIRED

NMP 830 KT: CAI Part # 310309-4

- 1 Diaphragm
- 2 Valve Plates
- 2 O-rings

TOOLS REQUIRED:

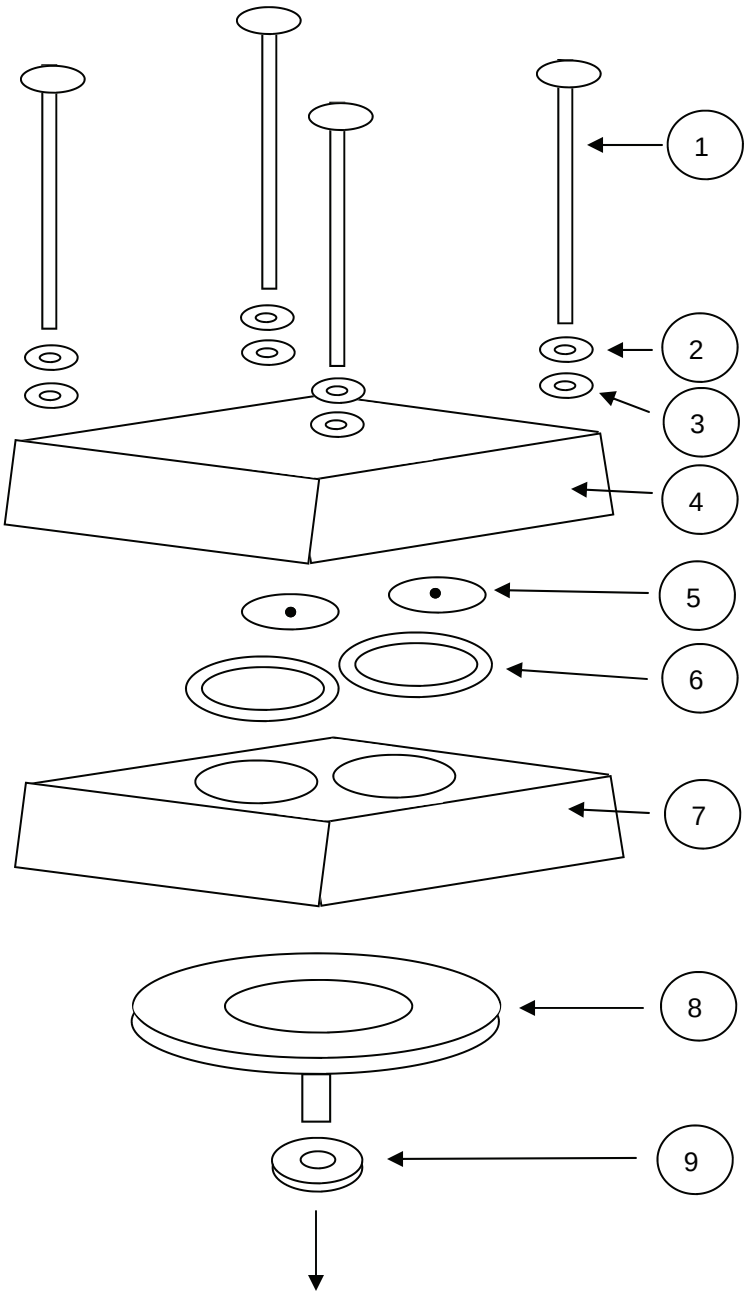
- Phillips screwdriver #1
- Pencil

CHANGING THE DIAPHRAGM

PROCEDURE:

1. Mark the position of head parts relative to each other by drawing a line with a pencil. This helps to avoid incorrect assembly later
2. Undo the four screws ① in the head
3. Lift the head plate ④and the intermediate plate ⑦ complete with valve plates ⑤ and O-rings ⑥ off the housing
4. Hold the pump with one hand, so that the diaphragm is pointing downwards. Lift the diaphragm ⑧ by the opposing side edges, grasp it and unscrew it in the counter-clockwise direction.
5. Take the diaphragm spacers ⑨ off the threaded portion of the diaphragm and put them on the threaded portion of the new diaphragm.
6. Move the connecting rod to the upper point.
7. Screw the new diaphragm ⑧ with spacers ⑨ clockwise onto the connection rod and tighten hand tight.
8. place the intermediate plate ⑦ on the housing, in the position indicated by the drawing line.
9. Exchange both valve plates ⑤ and both O-rings ⑥. The valve plates for pressure and suction sides are identical, as are upper and lower sides of the plates.
10. Place the head plate ④ on the intermediate plate ⑦, in the position indicated by the drawing line; gently tighten the four screws ① (with spring washer ② and washer ③) evenly and diagonally (if a torque screwdriver is available: torque about 0.30 Nm)
11. Let the pump run.

NMP 830KT



1	Screw
2	Spring Washer
3	Washer
4	Head Plate
5	Valve Plate
6	O-ring
7	Intermediate Plate
8	Diaphragm
9	Spacer

SPARE PARTS KITS

ELASTOMER REPLACEMENT KIT:

For Models N010AT.11l, N010ST.11l, N010AT.16l, N010ST.16l

Kit Part # 071708

QTY	ID#	DESCRIPTION
1	E	Teflon valve plate
2	H	Teflon diaphragm

HEAD PARTS REPLACEMENT KITS:

For Model N010ST.11l

Kit Part #200182

QTY	ID#	DESCRIPTION
1	A	Head plate
1	B	Intermediate plate
1	F	Flathead screw
1	G	Clamping disk
2	M	Panhead screws
1	M	Thermo switch
2	M	Washers
1	N	Heating element

For Model N010AT.16l

Kit Part #200183

For Model N010ST.16l

Kit Part #071714

QTY	ID#	DESCRIPTION
1	A	Head plate
1	B	Intermediate plate
1	F	Flathead screw
1	G	Clamping disk

Note: If your model number begins with MPU, PU or PJ, contact KNF Customer Service for the proper Parts Kit, as the contents may differ from those listed above.

CHANGING THE DIAPHRAGM AND VALVE PLATE

During Normal use, the diaphragm and valve plate are the only parts of the pump that need to be replaced. If you run into a problem or have a question regarding the following procedure, please call KNF Applications Engineering for assistance.

MATERIALS/TOOLS NEEDED:

The proper replacement kit
Marking pencil
7mm Nut driver
Slotted-head screwdriver

PROCEDURE:

SHUT OFF ALL POWER and UNPLUG POWER CORD

1. It is usually not necessary to remove the heated-head (.11) wiring.
2. Mark the relative positions of the head plate **A** intermediate plate **B** and mounting ring **C** with a line using a marker for ease or re-assembly later.
3. Undo the 4 head nuts & flat washers **D**, and 6 cup washers **L** from the studs and lift off the head plate **A,** valve plate **E** and intermediate plate **B.**
4. Lightly clean the valve seat area of the head plate **A** and intermediate plate **B,** if necessary, of any deposits with fine steel wool. This area must be clean and smooth without pits or scratches to obtain best performance
5. Loosen the countersunk slotted-head clamping disc screw **F** and remove the clamping disc **G**, the two diaphragms **H,** connecting rod disc and shim disks **P**. ***Replace exact number of shims when reassembling.***
6. Turn the motor fan or counterweight by hand until the connecting rod **K** is at mid-stroke, and place the shim disk(s) **P**, the connection rod disc, two new diaphragms **H** on the housing **C,** lining up screw holes. Brown side down (if applicable).
7. Place the clamping disc **G** (bevel side up) on top of the two new diaphragms **H.** Tighten the countersunk clamping disc screw **F** ***SNUGLY*** (but not too tight)
8. Place the intermediate plate **B** over the diaphragm, lining up the marks made previously in step 2.
9. Place the valve plate **E** on top of the intermediate plate **B,** orienting the valve flaps with the holes. Brown side down (if applicable)
10. Place the head plate **A** on top of the valve plate **E**, Lining it up with the markings you made in step 2.

CHANGING THE DIAPHRAGM AND VALVE PLATE

PROCEDURE: (continued)

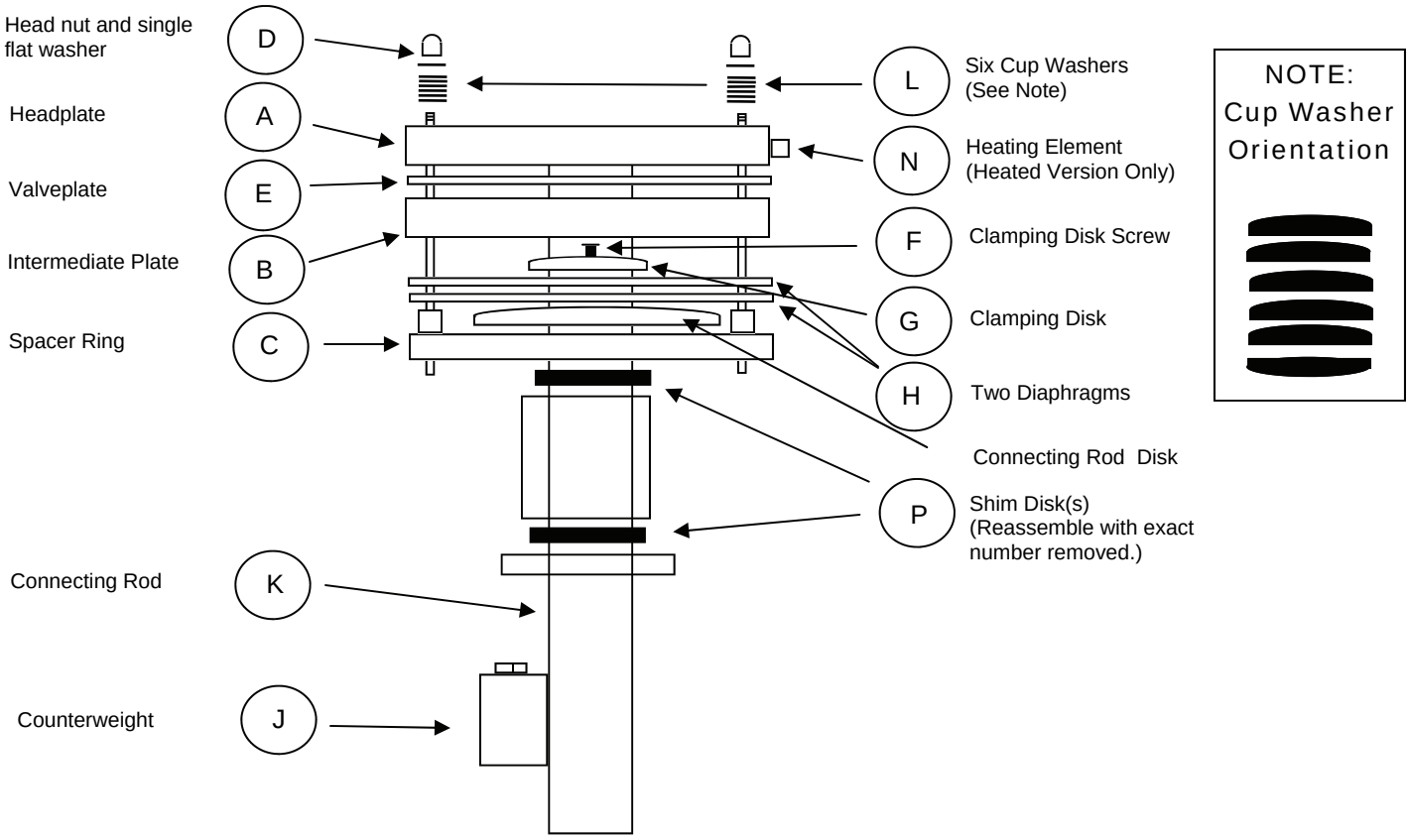
11. Be sure that all components are centered. Position the 6 cup washers **L** over each stud, oriented as shown in the diagram, then the flat washer. Tighten the 4 head nuts **D** in a crisscross pattern to a ***SNUG FIT***. Do not over tighten. Remove any old TEFLON tape from all fittings. Carefully apply two layers of TEFLON tape around any fittings before reinstalling into pump head. Do not apply tape beyond threads, as excess tape may tear off and lodge in the valve. ***Do not substitute fro any other type of tape!***
12. Check that the pump runs freely by turning the motor fan or counterweight **J** by hand. Check all mechanical and electrical connections for tightness. Replace the housing lid.
13. Apply power to the pump. Listen for a possible "knocking" sound. If it is present, equally loosen the four head screws slightly until the sound just disappears. This step is to be sure that the clamping disc does not touch the intermediate plate during operation.

Notes: Should you need to send a KNF pump to our factory for repairs, please be sure to read the instructions in the Limited Warranty section with regard to obtaining an RMA (Return Materials Authorization) number prior to shipment.

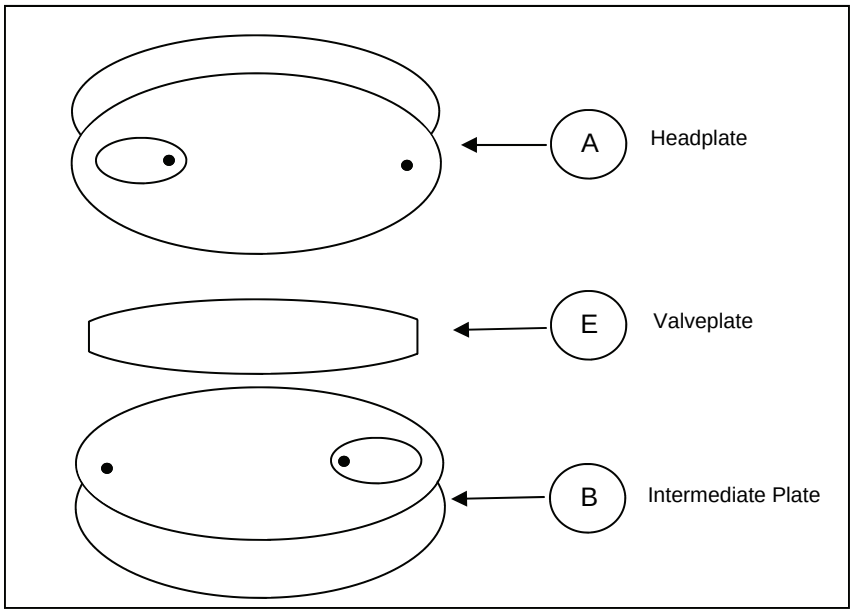
FOR SERVICE OR PARTS CONTACT:

KNF NEUBERGER, INC.
Two Black Forest Road
Trenton, NJ, 08691-1810
(609) 890-8600 phone
(609) 890-8323 fax
http://www.knf.com

UN010KT



NOTE:
Cup Washer Orientation



CAUTION:
Be sure valve ports and valve plate are positioned as shown in Figure A
(Large hole opposite small hole).

Figure A

3. Ozone and Sample Capillary Cleaning

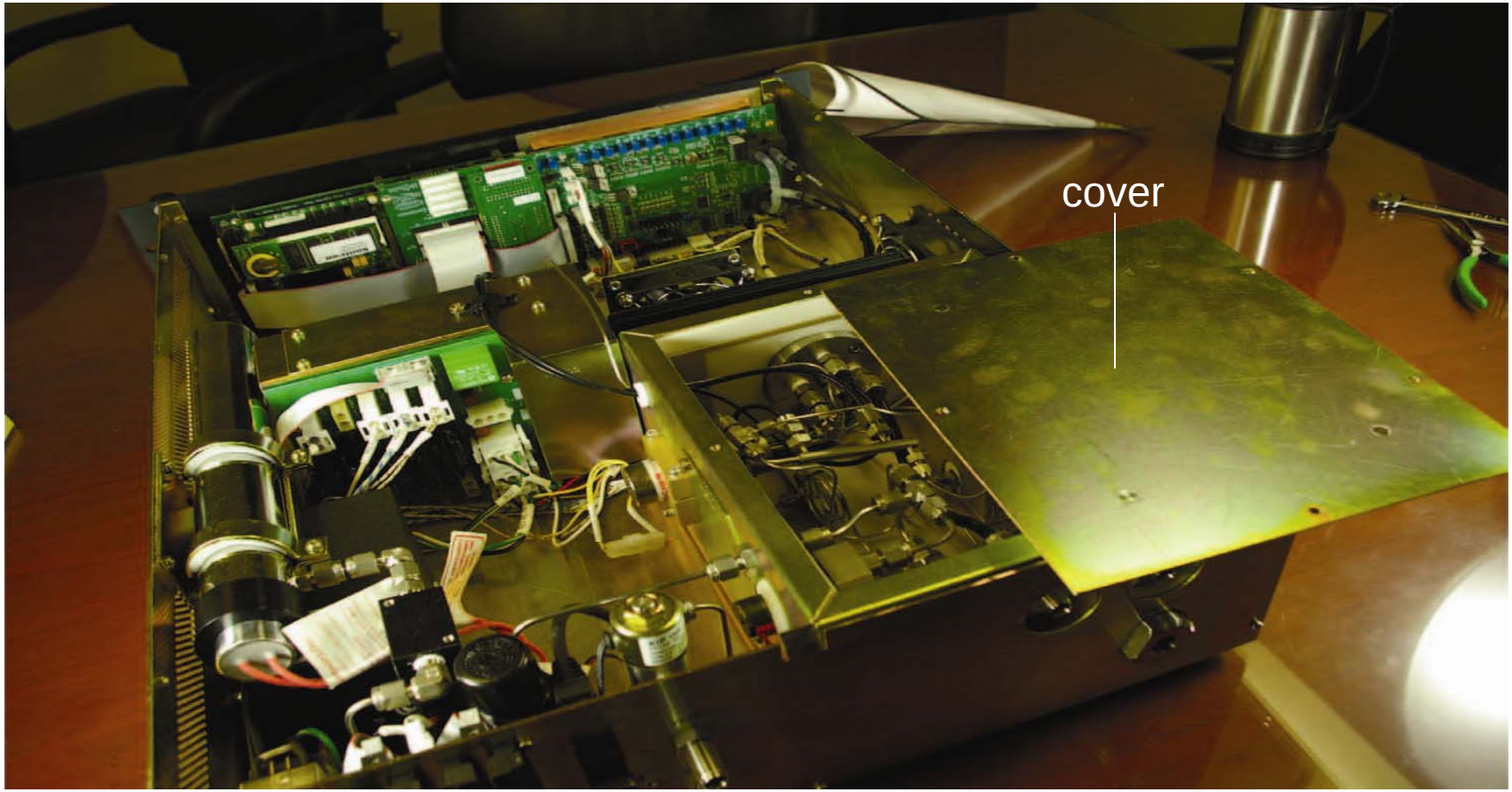
400/600 CLD/HCLD

OZONE CAPILLARY CLEANING

SAFETY INSTRUCTIONS

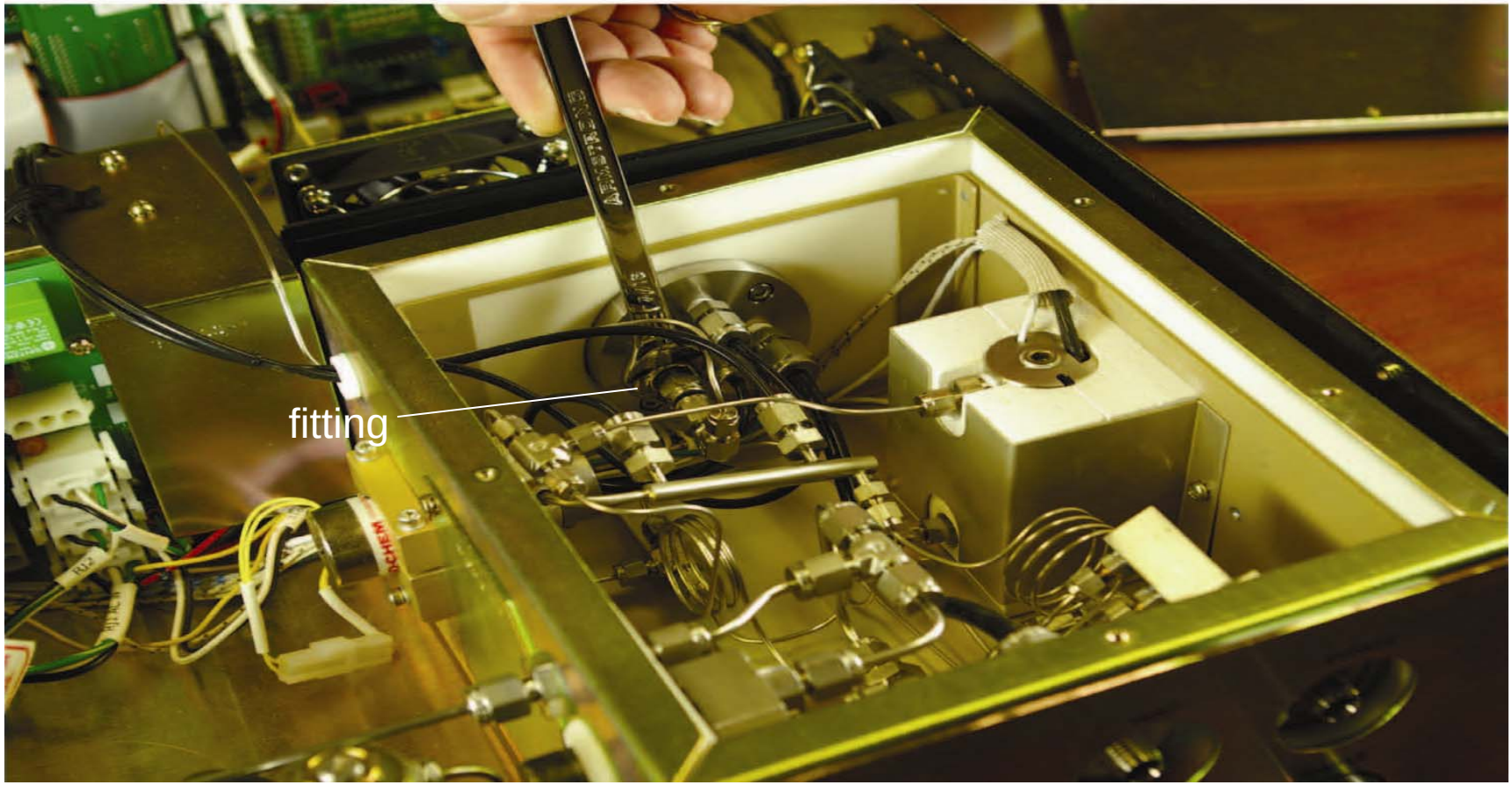
- Before Working on Analyzer
  - Remove Power Connections
- Proper Safety Procedures Must Be Observed At All Times

If the analyzer has an oven
Using a Phillips screwdriver remove the six screws and set cover aside

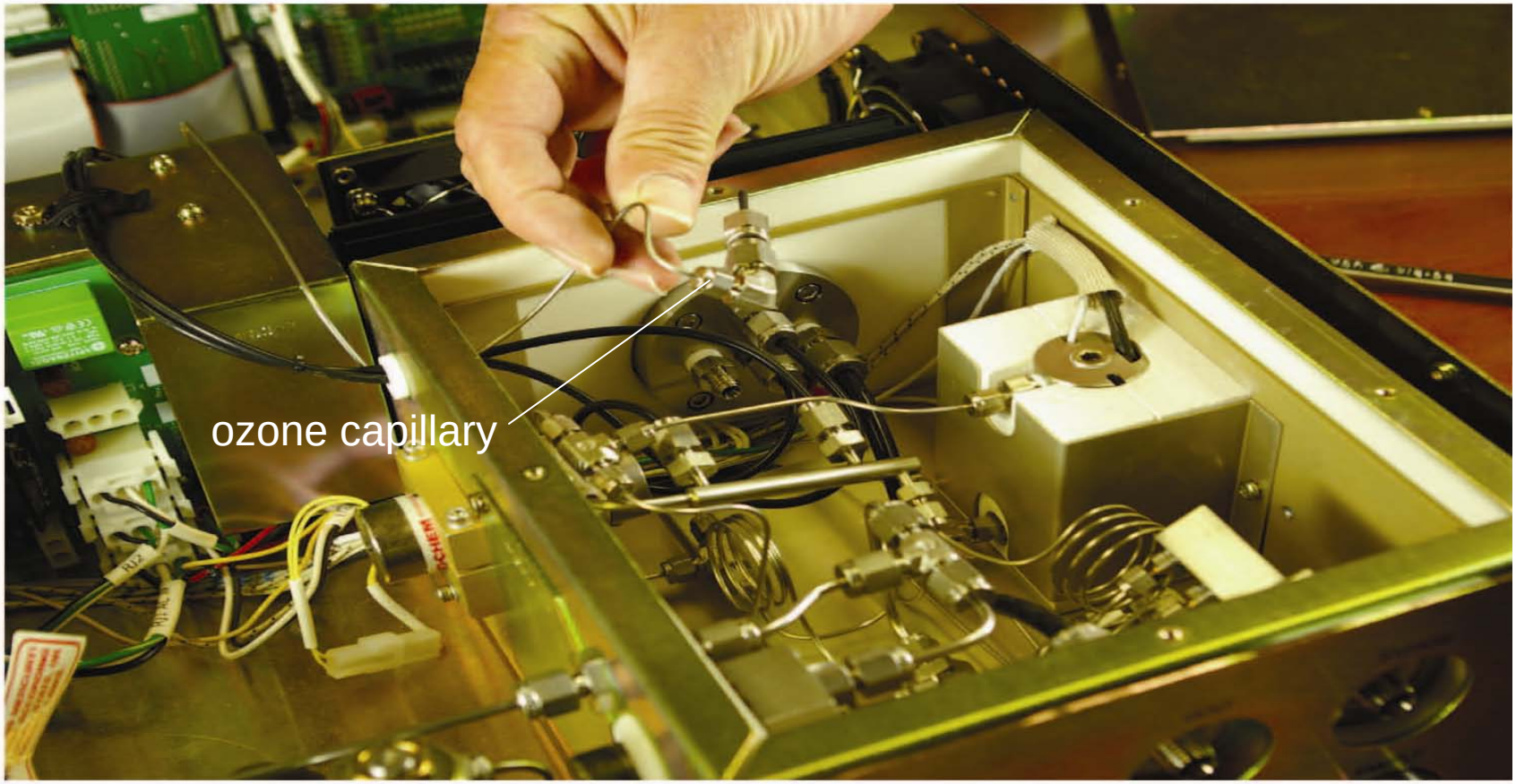


Using a 7/16th wrench, loosen the fitting on the left side of the measuring chamber and pull out the ozone capillary

You may need to use a back up wrench

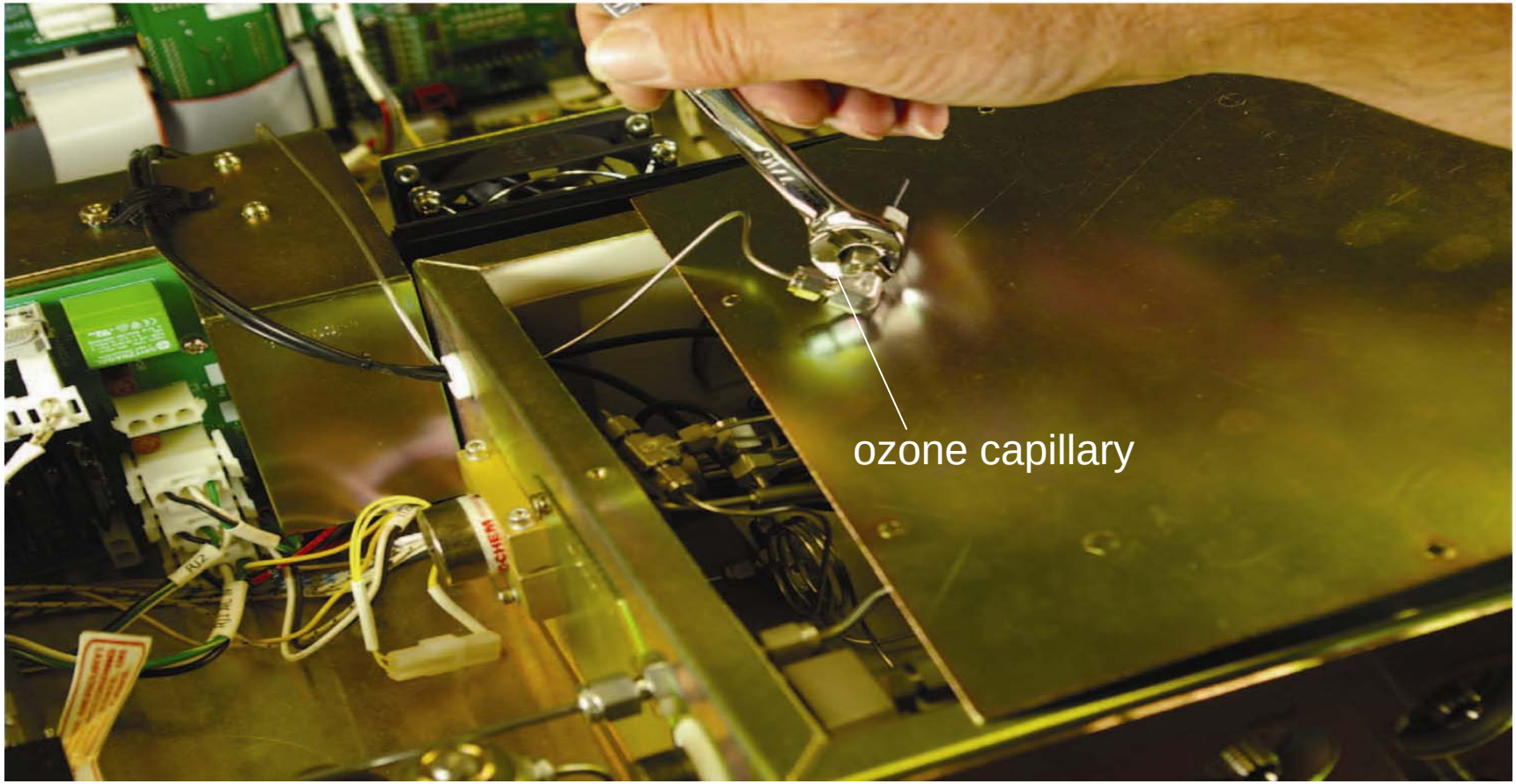


Disconnect the ozone capillary from the tubing

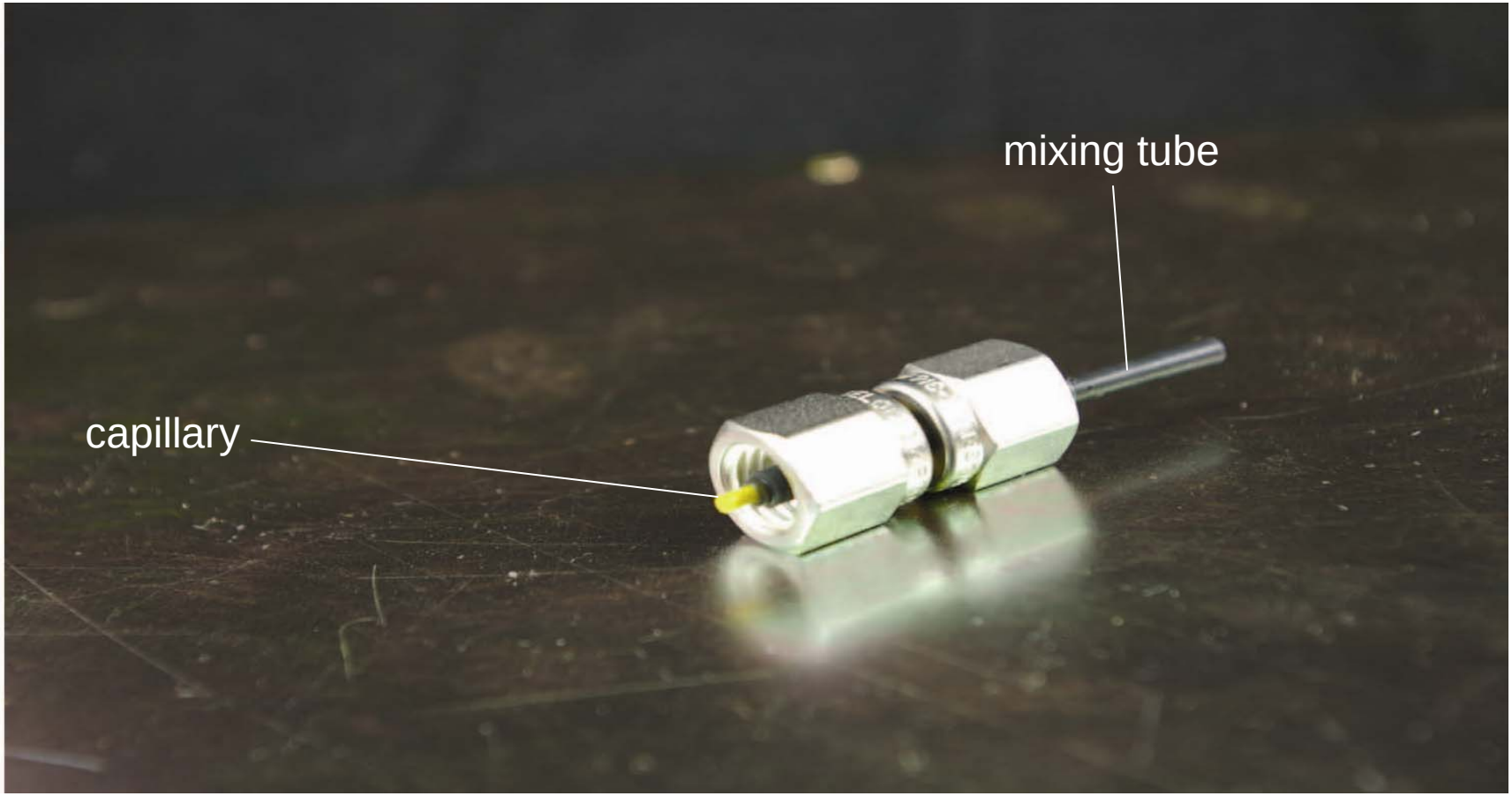


A second 7/16th wrench may be needed to hold the elbow

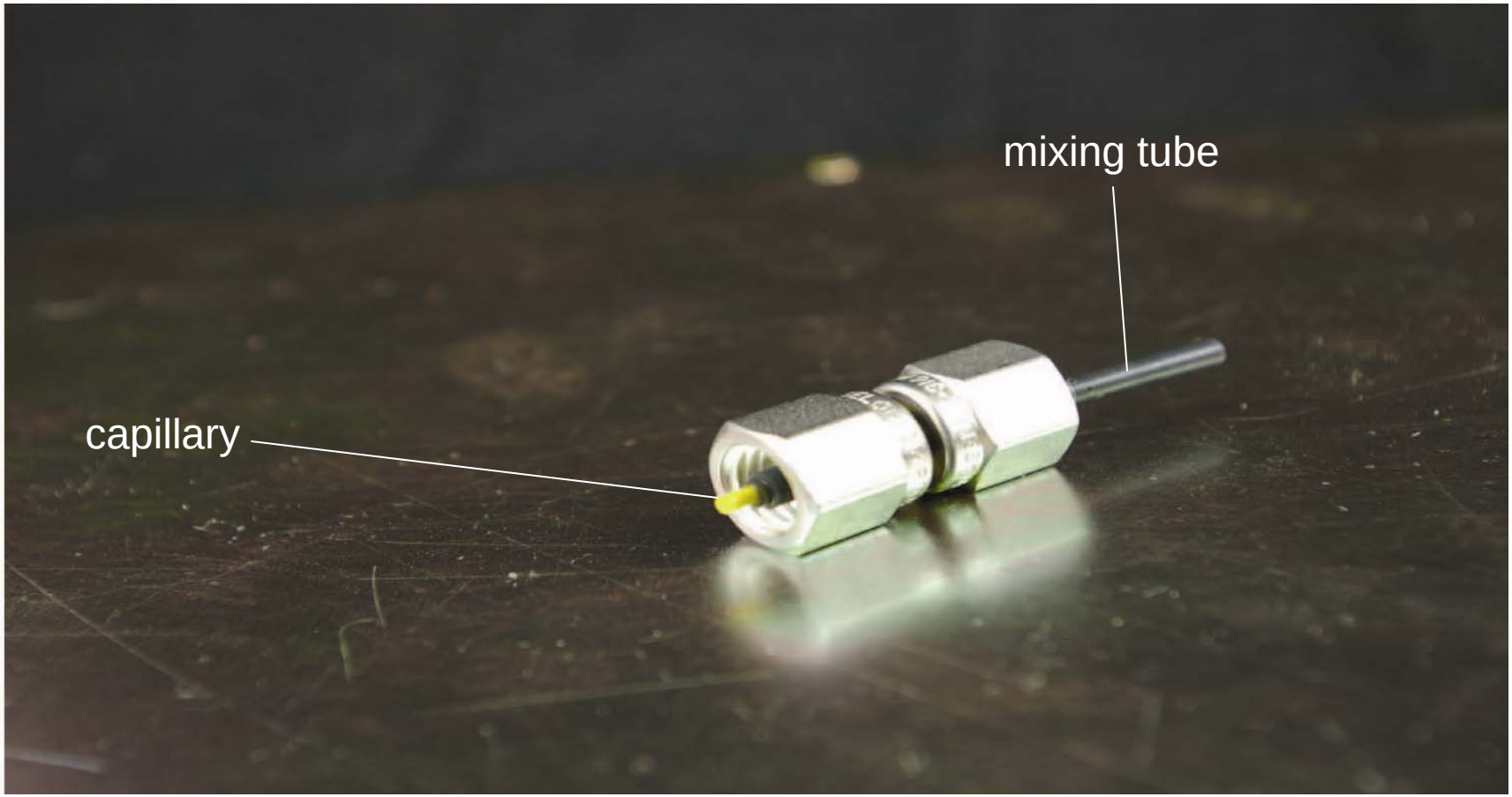
While disconnecting the ozone capillary a second 7/16 wrench may be needed to hold the elbow



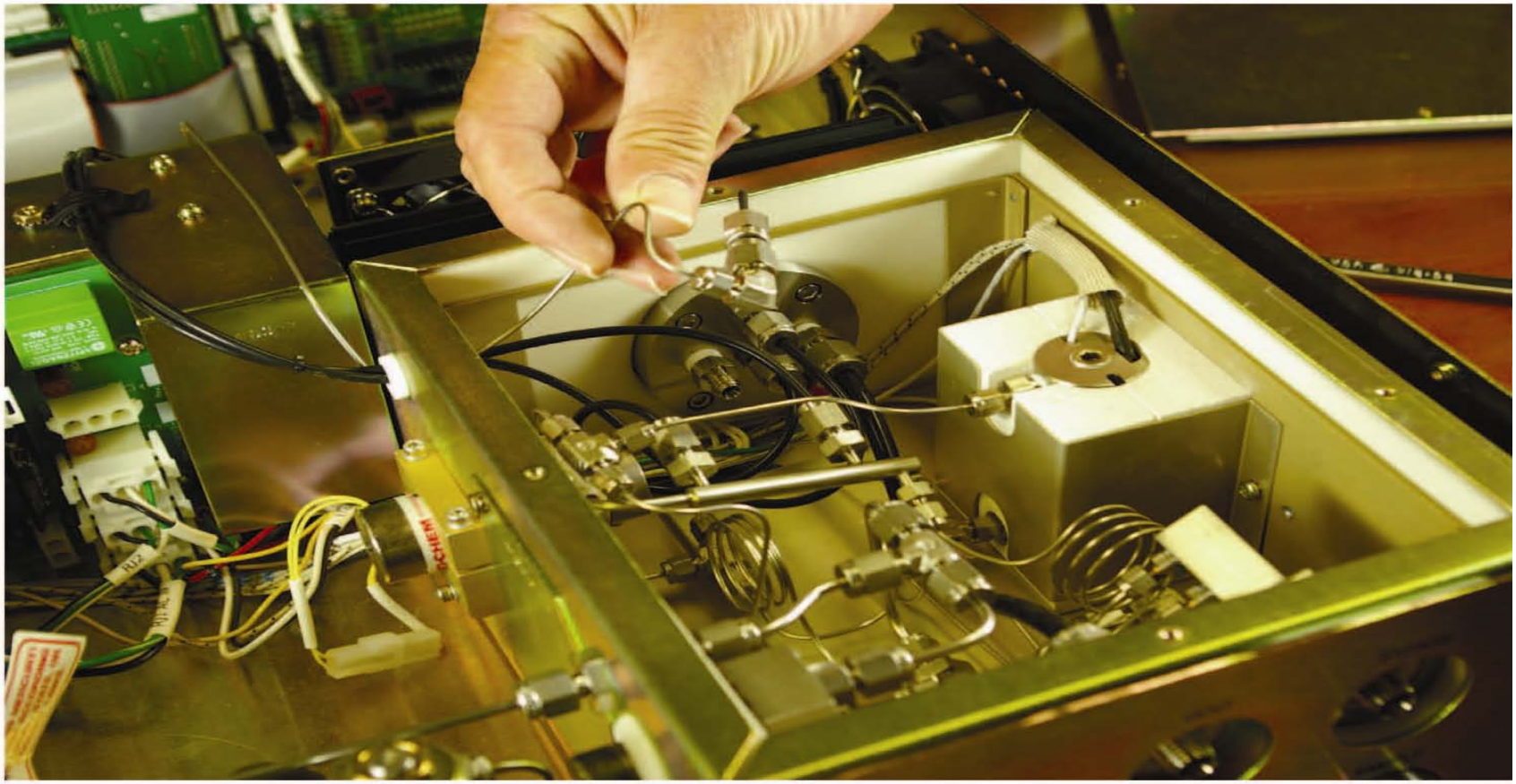
Check the capillary for damage and/or discoloration



Using high pressure air, blow out the tubing in both directions to clean.



Reassemble in opposite steps



Make sure not to bend the mixing tube when inserting it into the measuring chamber

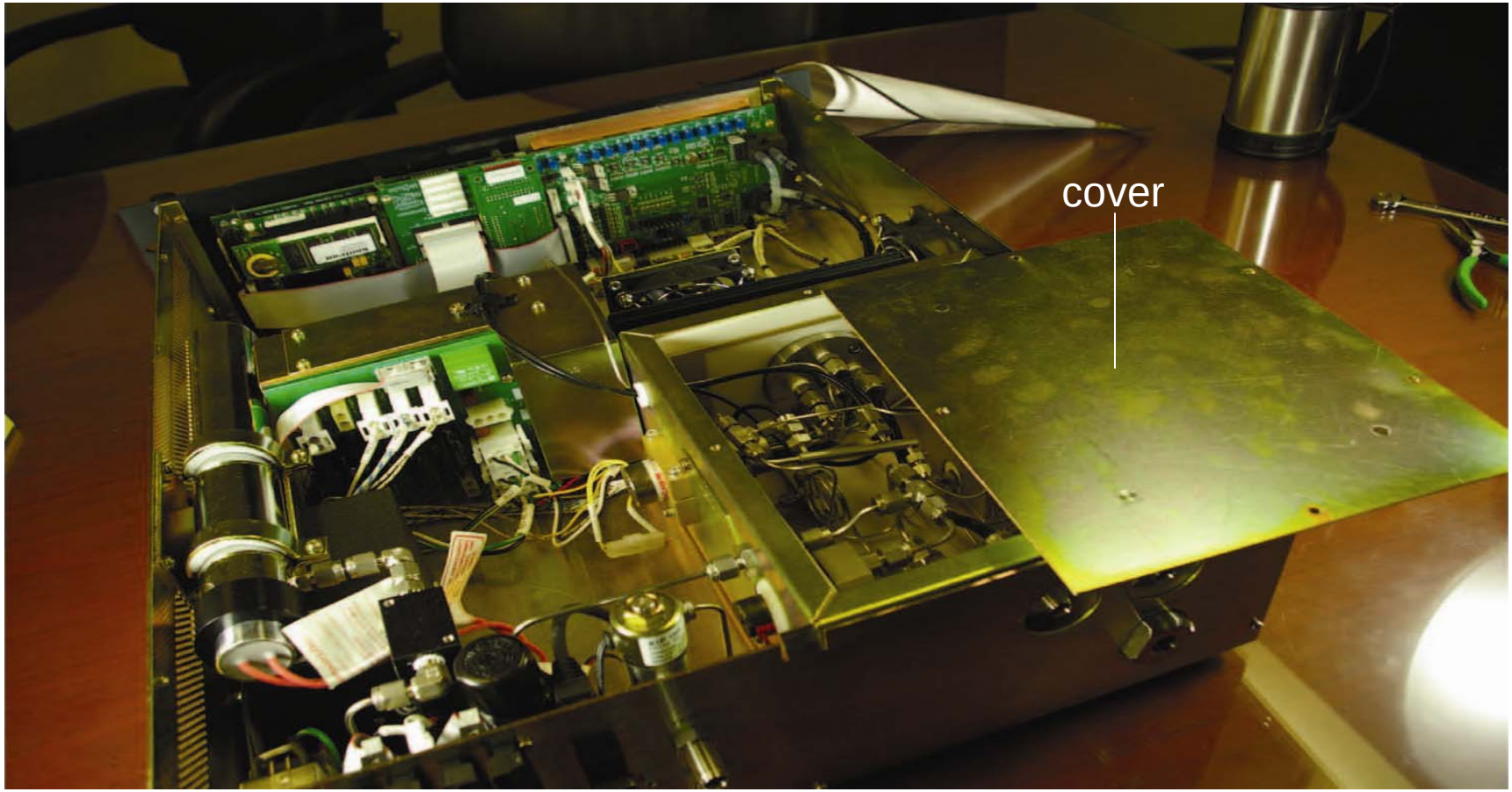
400/600 CLD/HCLD

SAMPLE CAPILLARY CLEANING

SAFETY INSTRUCTIONS

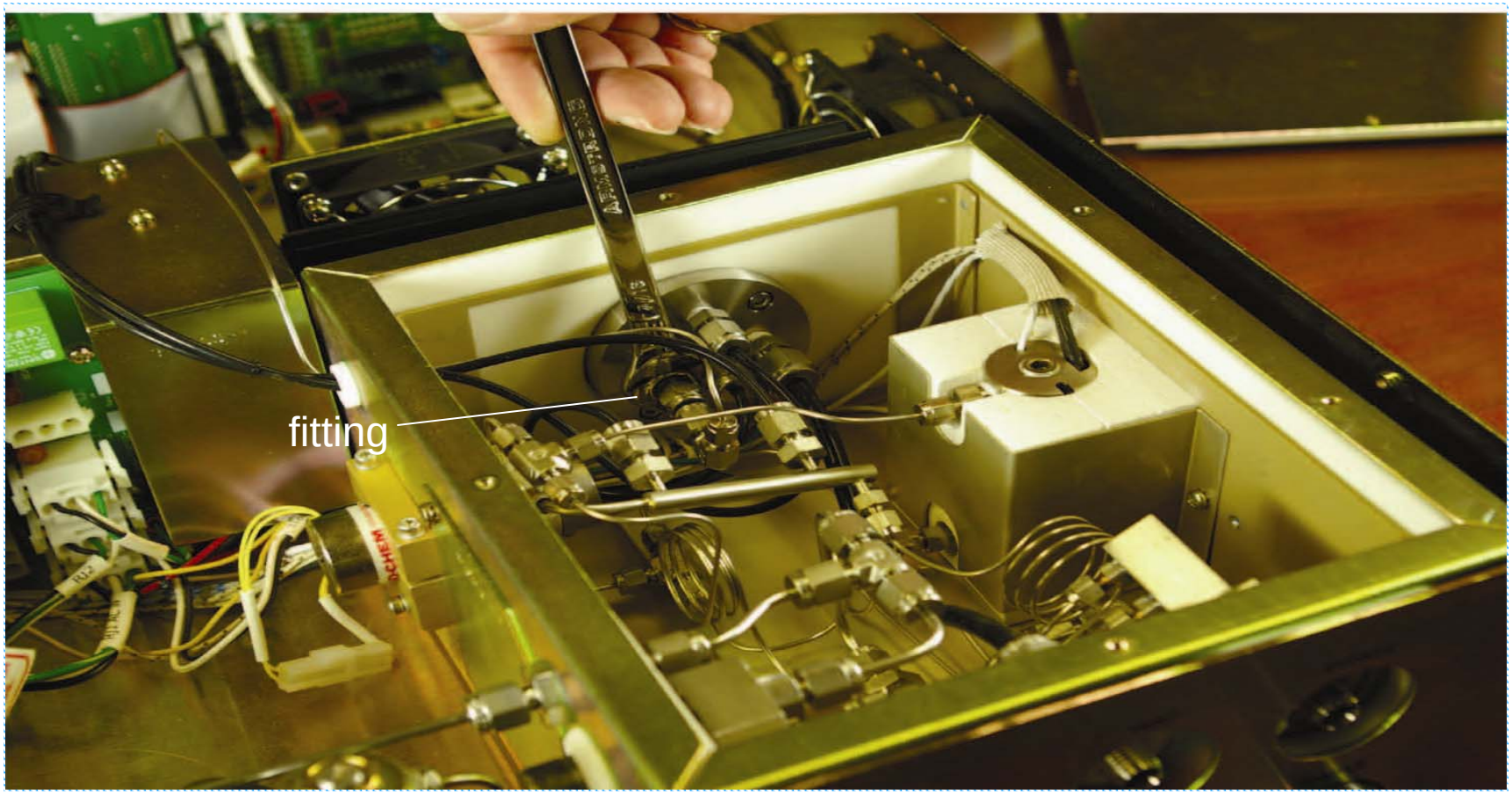
- Before Working on Analyzer
  - Remove Power Connections
- Proper Safety Procedures Must Be Observed At All Times

If the analyzer has an oven
Using a Phillips screwdriver remove the six screws and set cover aside



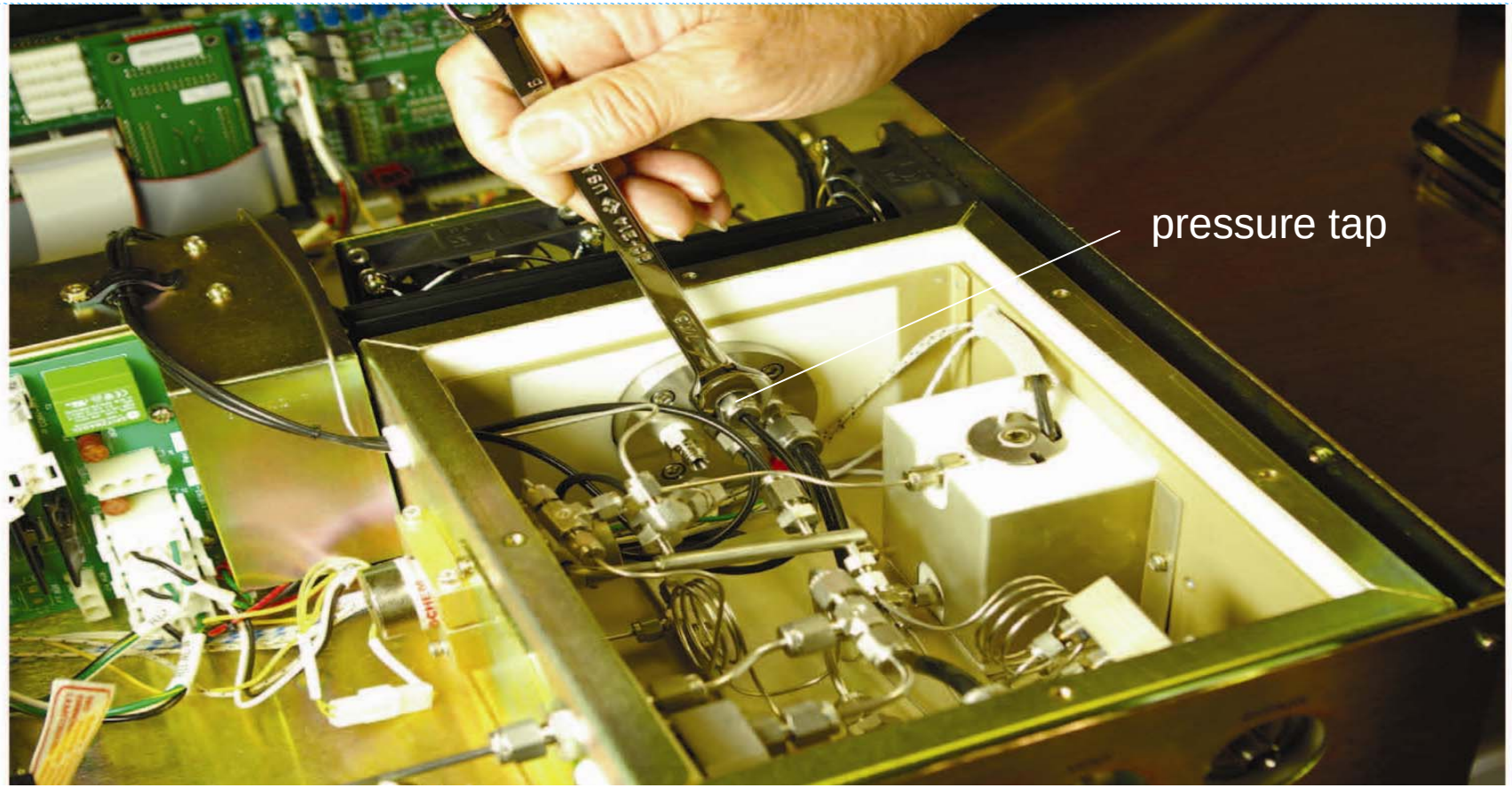
Using a 7/16th wrench, loosen the fitting on the left side of the measuring chamber and pull out the ozone capillary

You may need to use a back up wrench



Using the same 7/16th wrench, remove the pressure tap

You may need to use a back up wrench

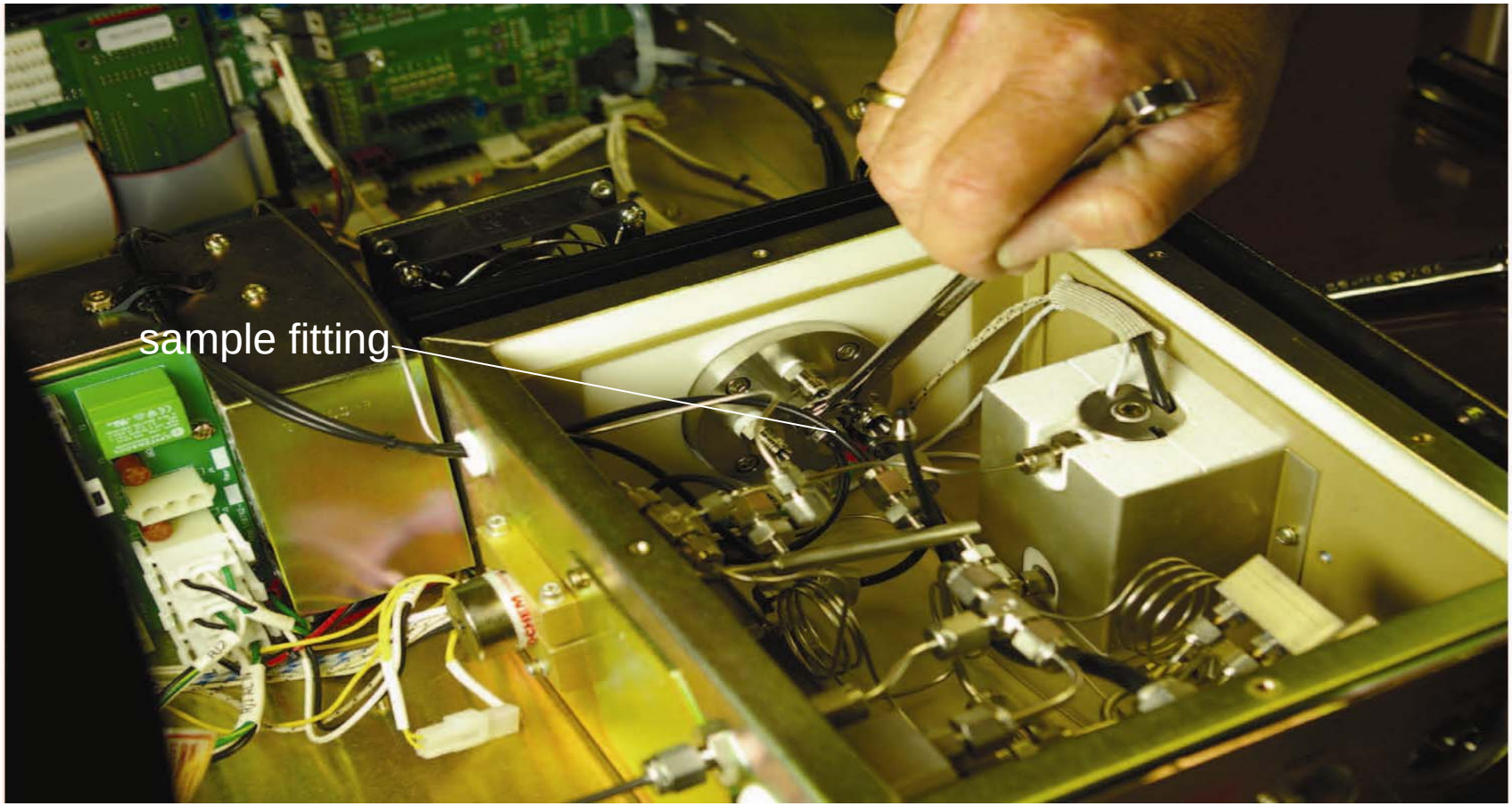


Using 9/16th wrench, remove the outlet tube

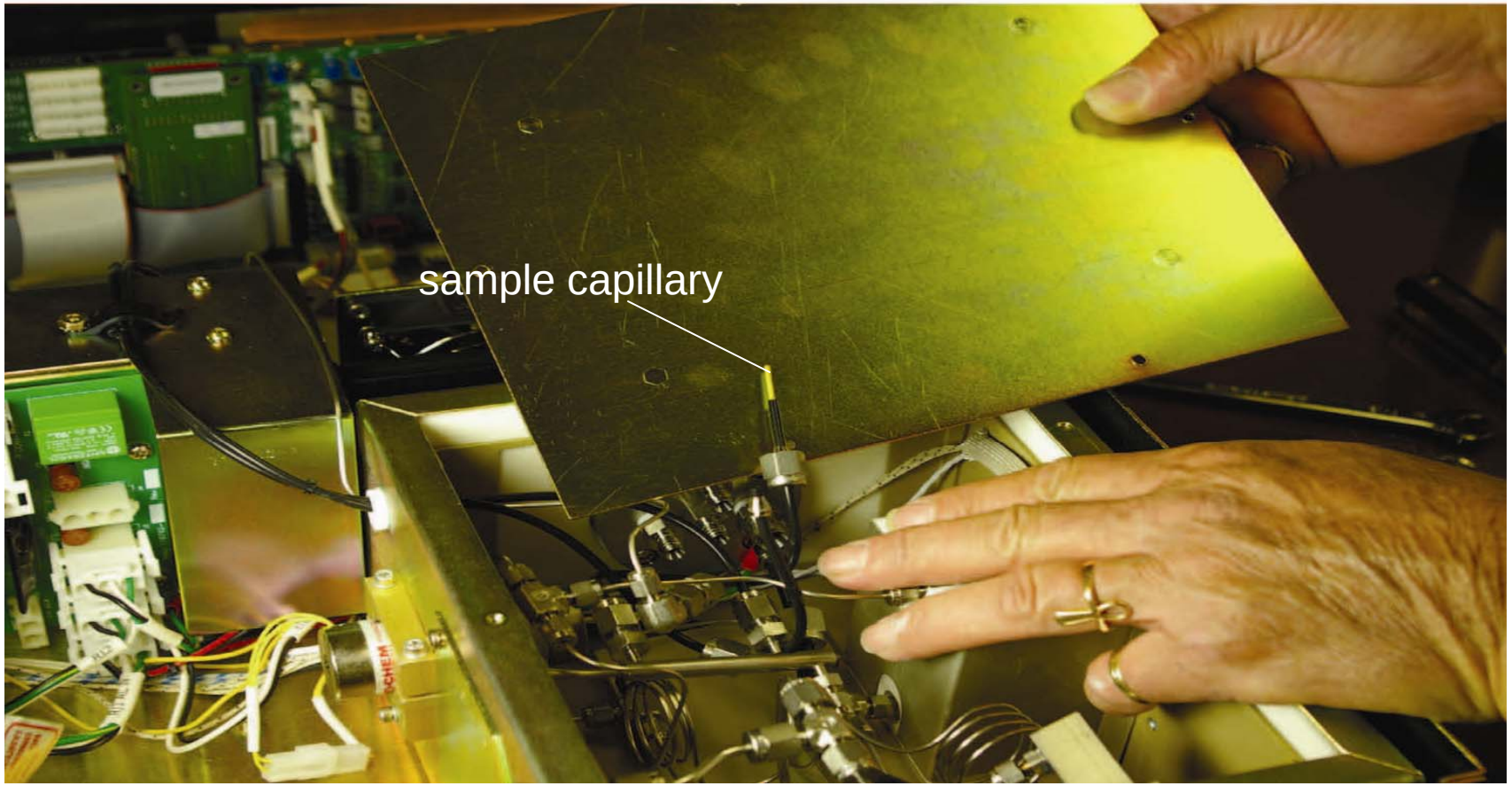
You may need to use a back up wrench

Using 7/16th wrench, remove sample fitting

You may need to use a back up wrench or wedge screwdriver



Pull out the sample capillary from the measurement chamber



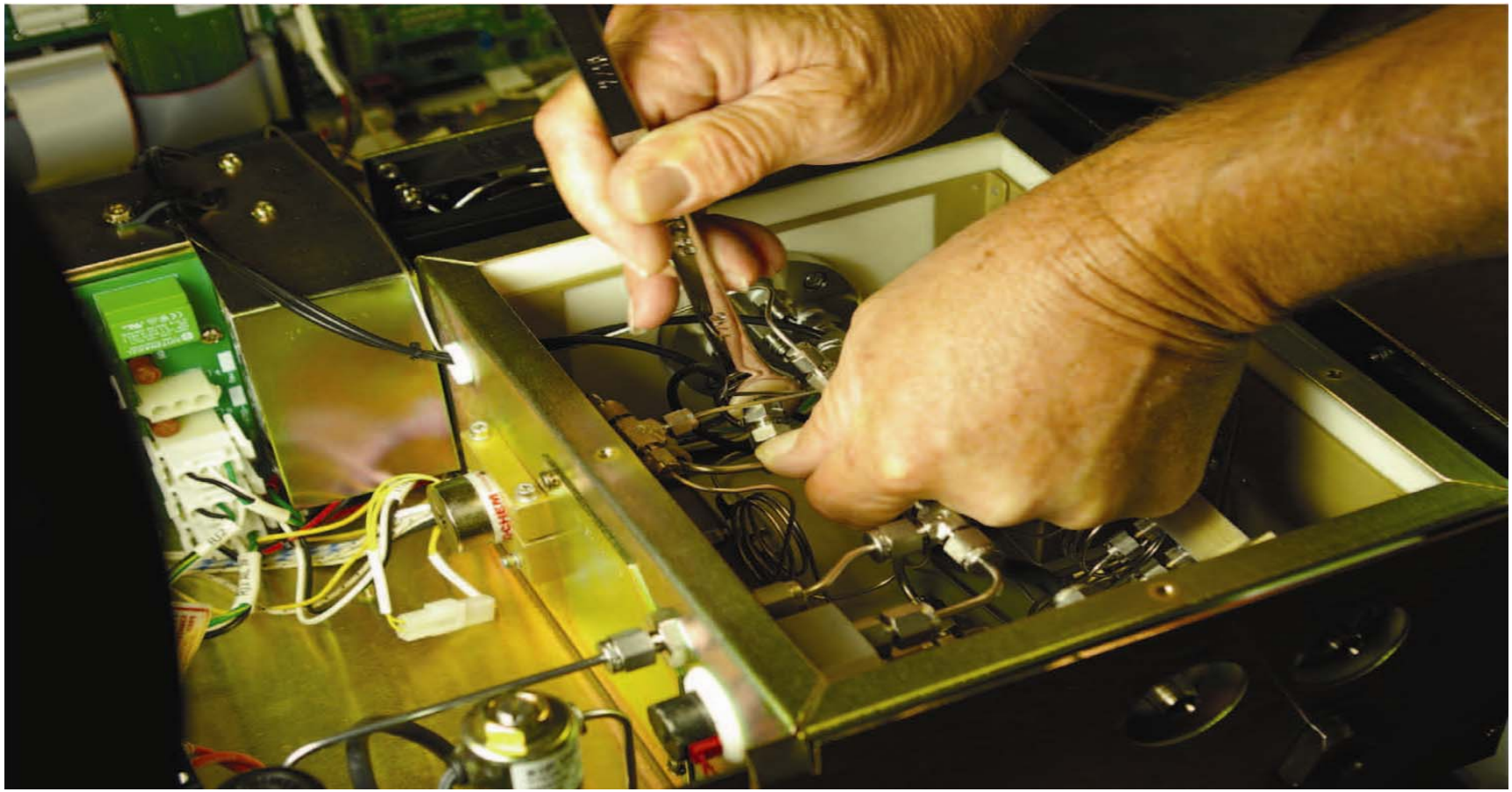
Make sure not to bend the capillary

To free the sample capillary and tubing from the analyzer, remove the fitting from the manifold

You may need to use a back up wrench

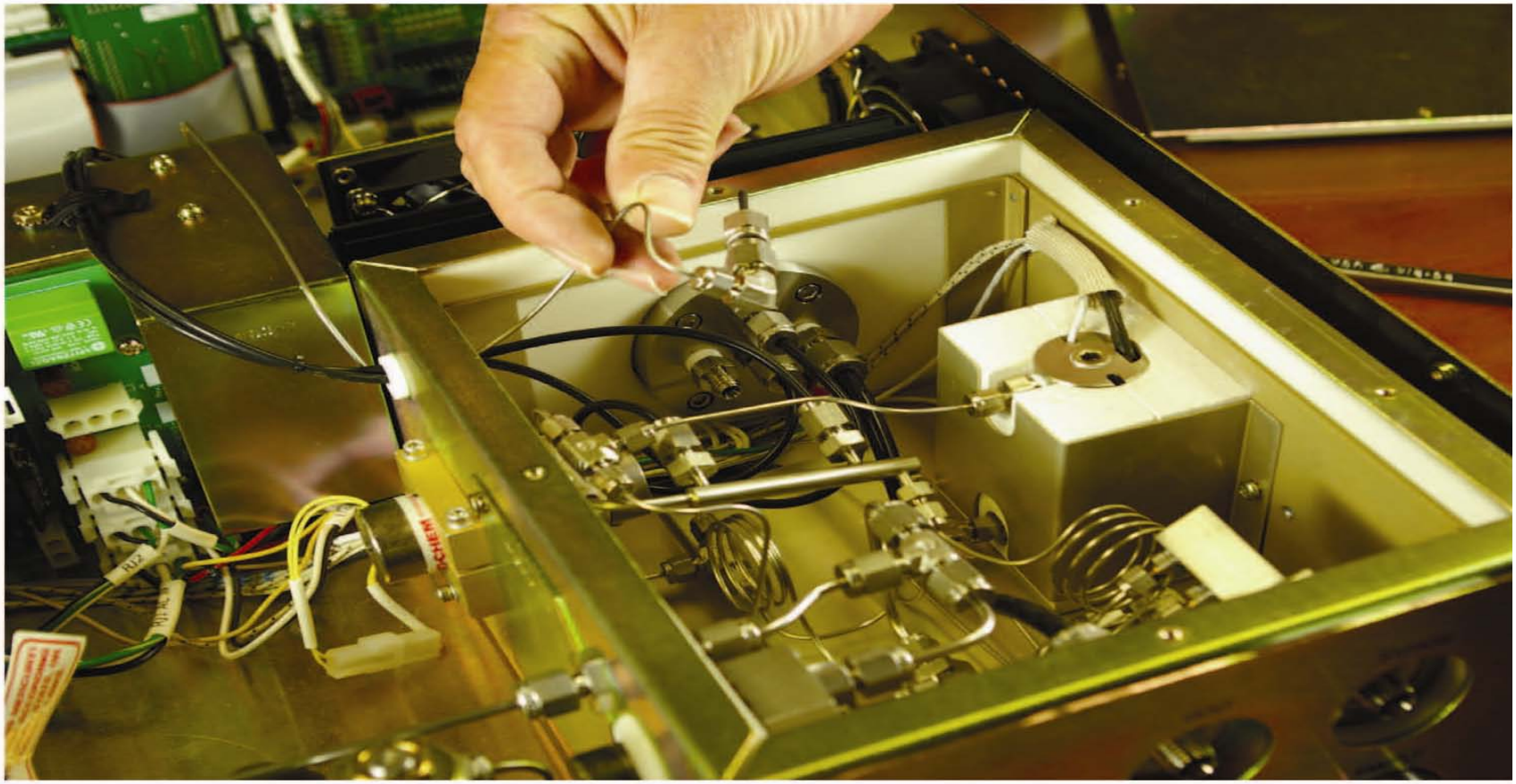
Using high pressure air, blow out the sample capillary in both directions.

You may need to use a back up wrench



If unable to clean, replace the sample capillary and sample tube

Reassemble in opposite steps



4. Ozone Lamp Replacement

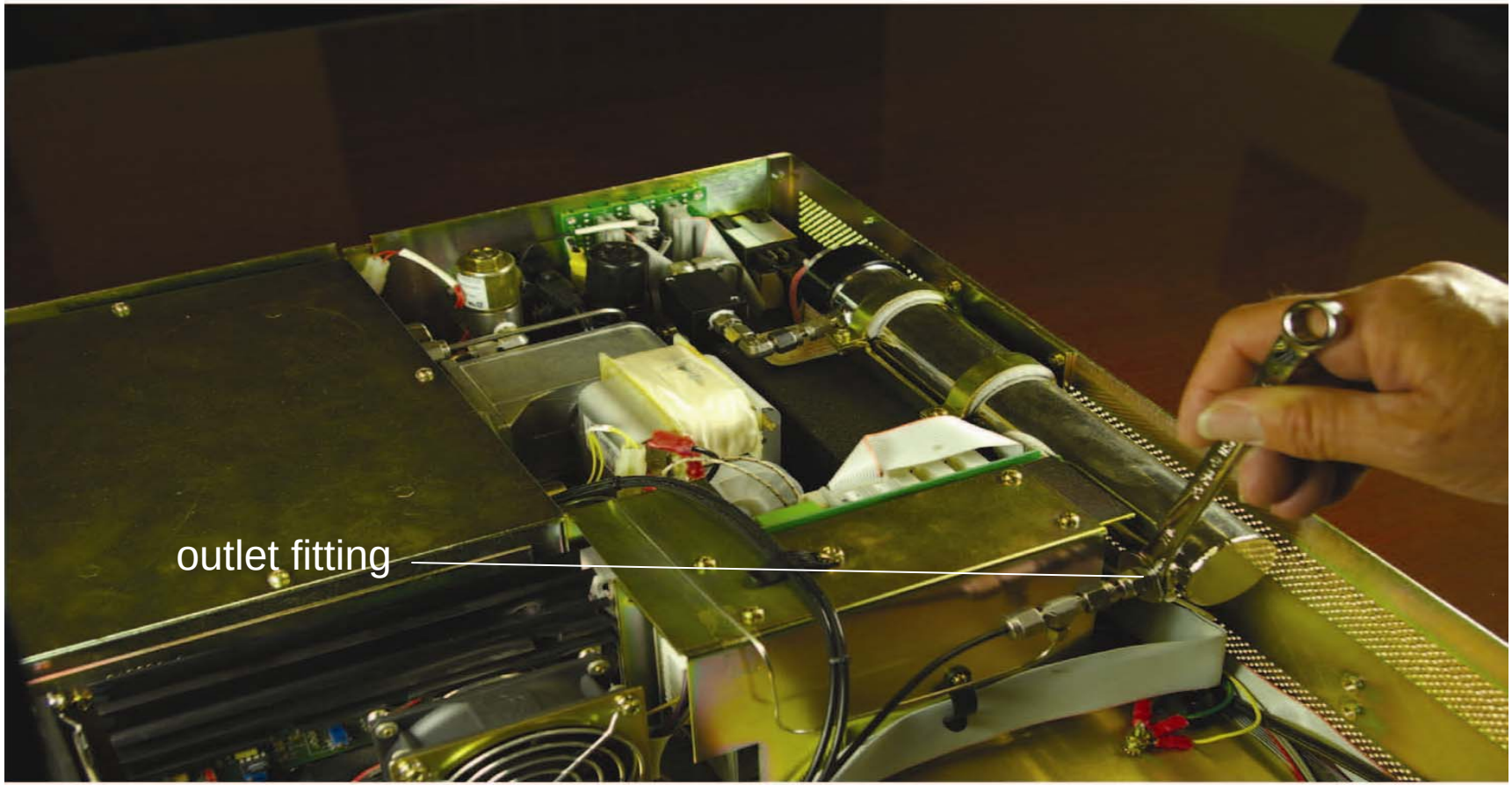
400/600 CLD/HCLD

OZONE LAMP REPLACEMENT

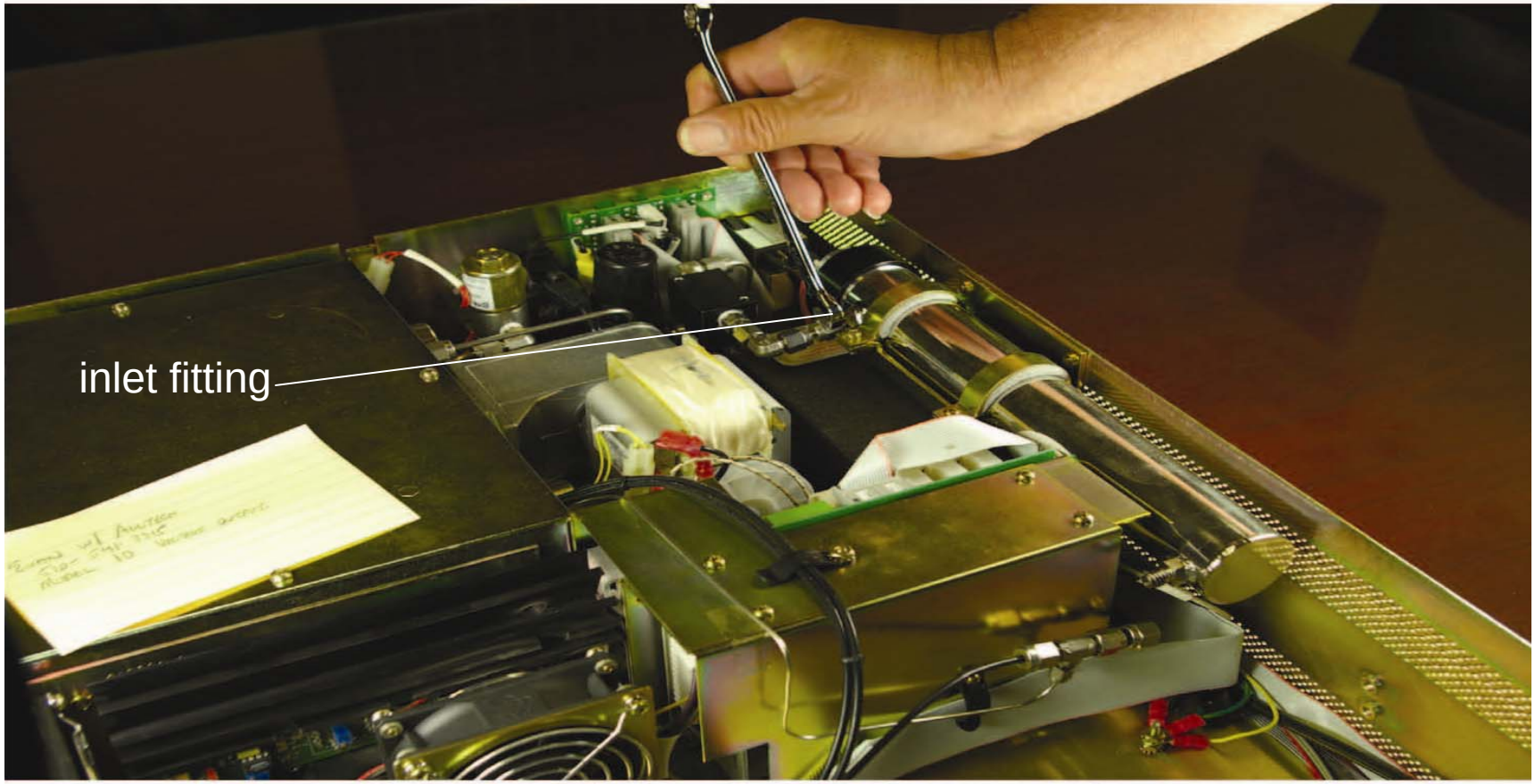
SAFETY INSTRUCTIONS

- Before Working on Analyzer
  - Remove Power Connections
- Proper Safety Procedures Must Be Observed At All Times

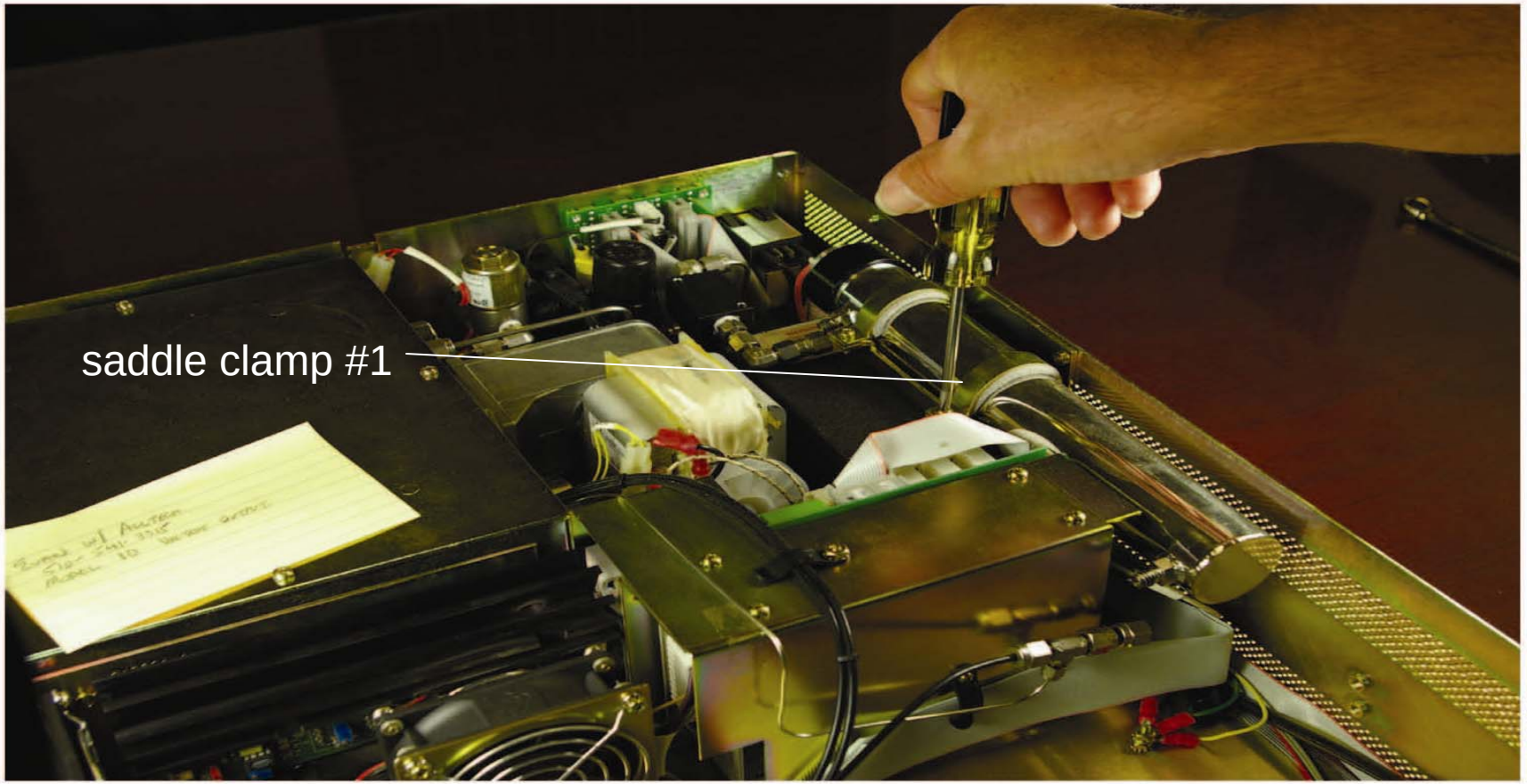
Using 7/16th” wrench remove the outlet fitting



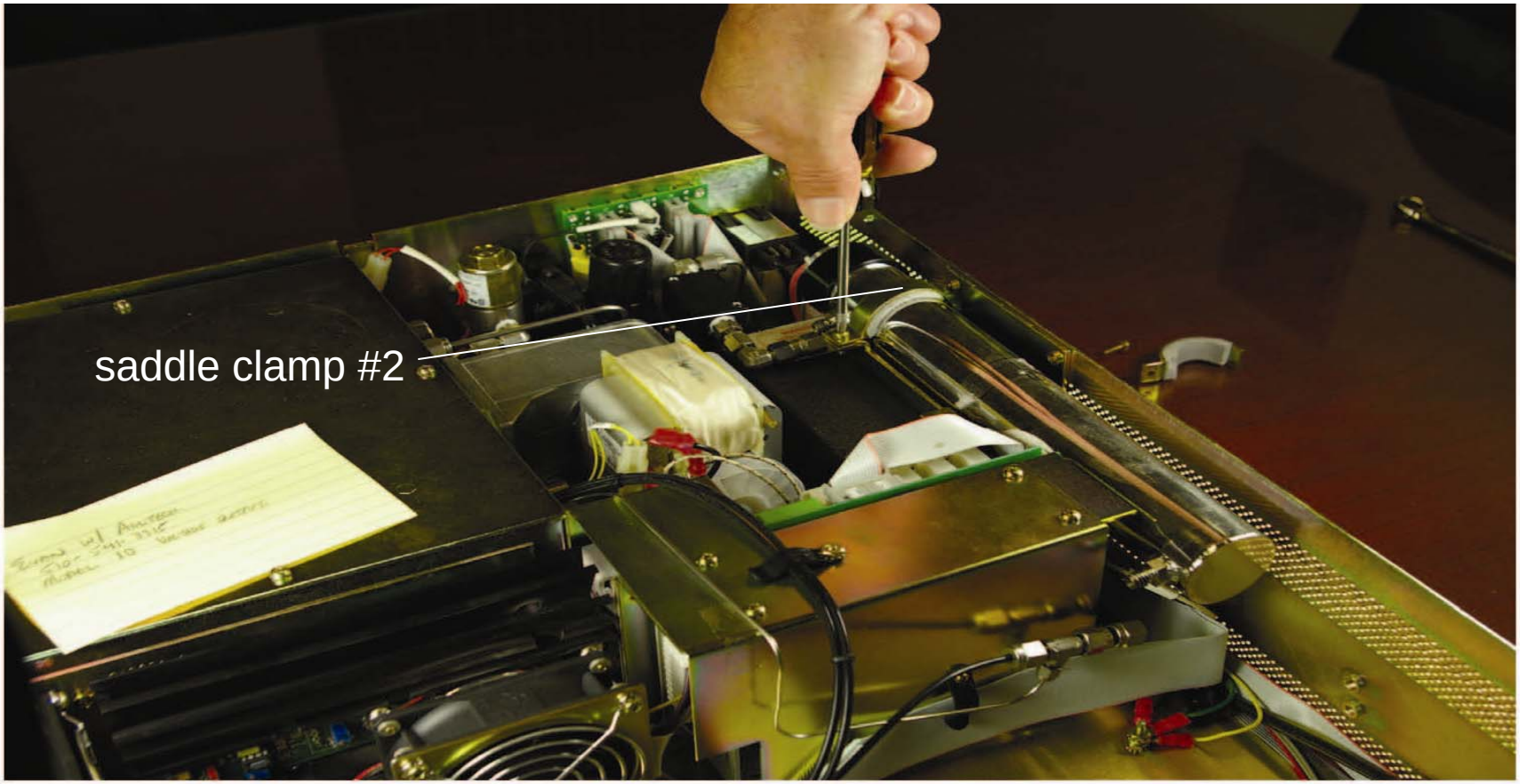
Using 7/16th” wrench remove the inlet fitting



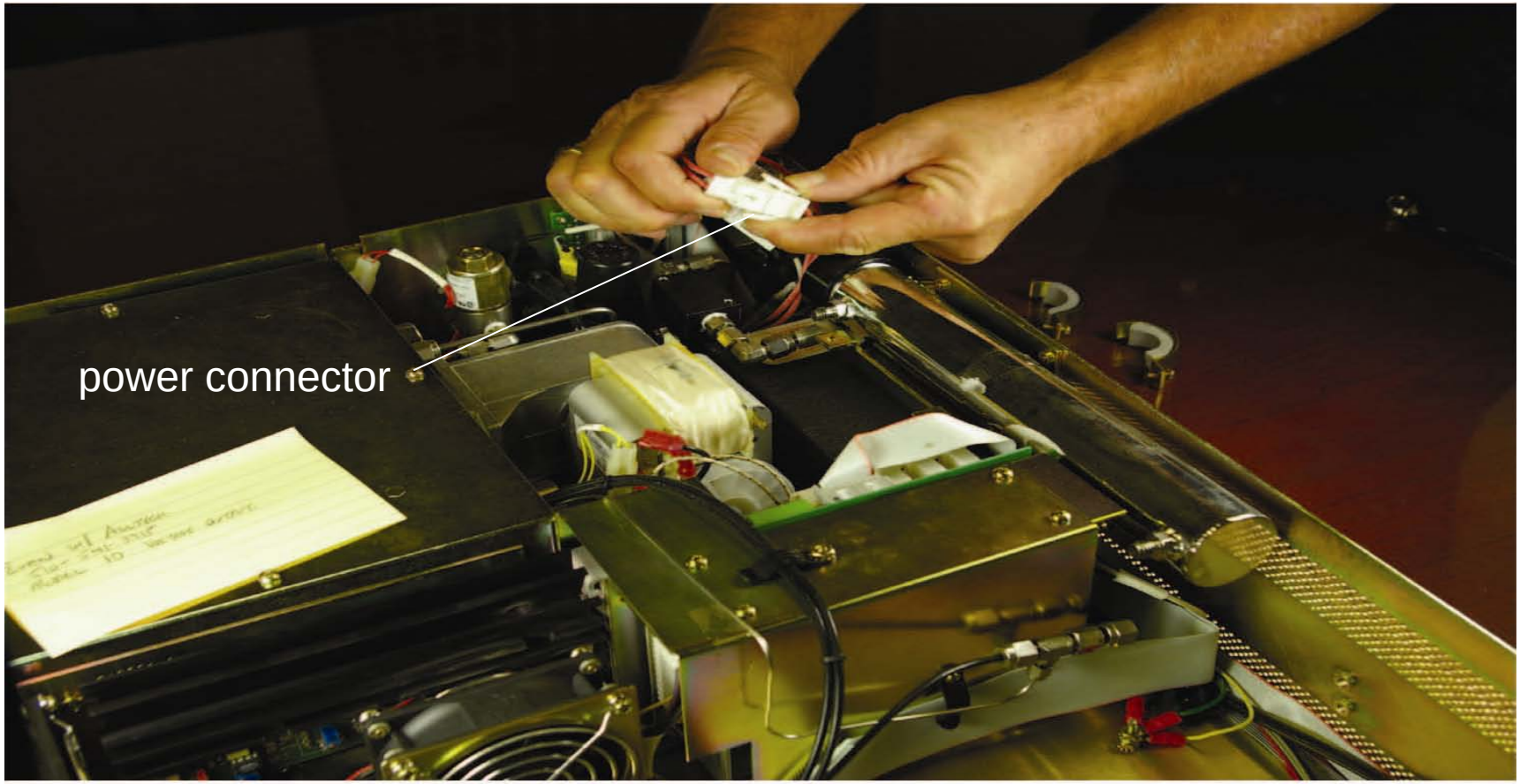
Using a Phillips screwdriver, remove the saddle clamps (2)



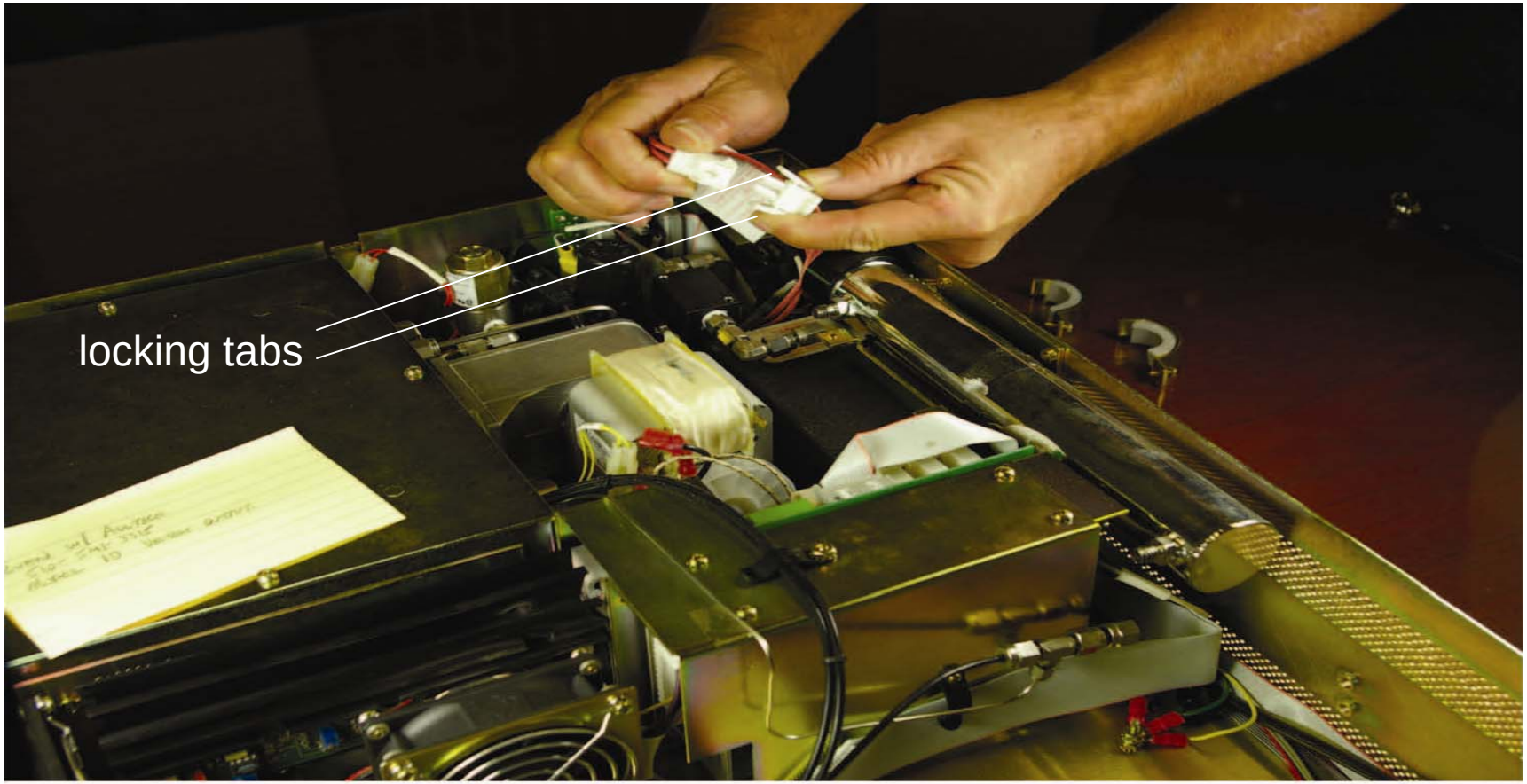
Using a Phillips screwdriver, remove the saddle clamps (2)



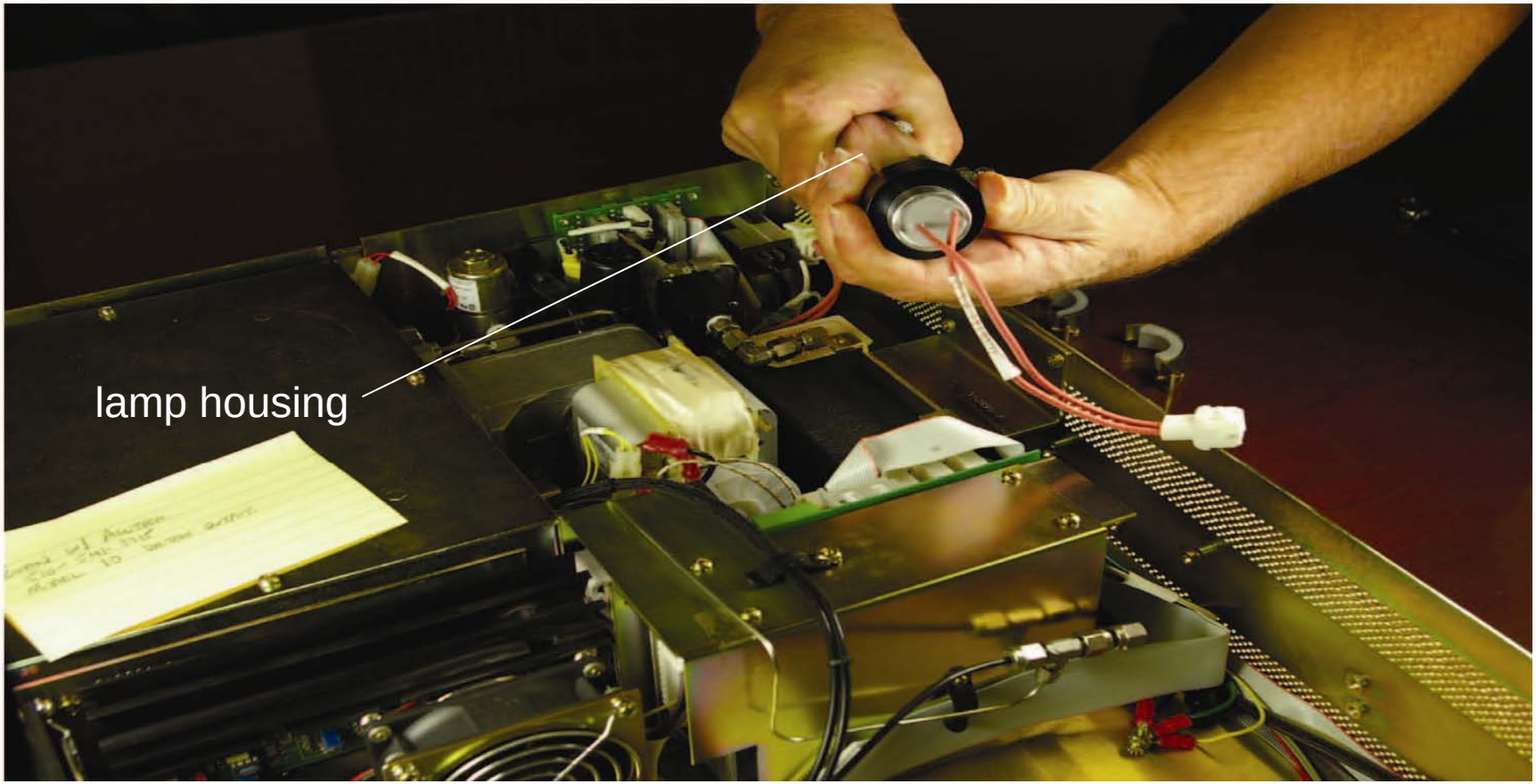
On the power connector, squeeze the two locking tabs together



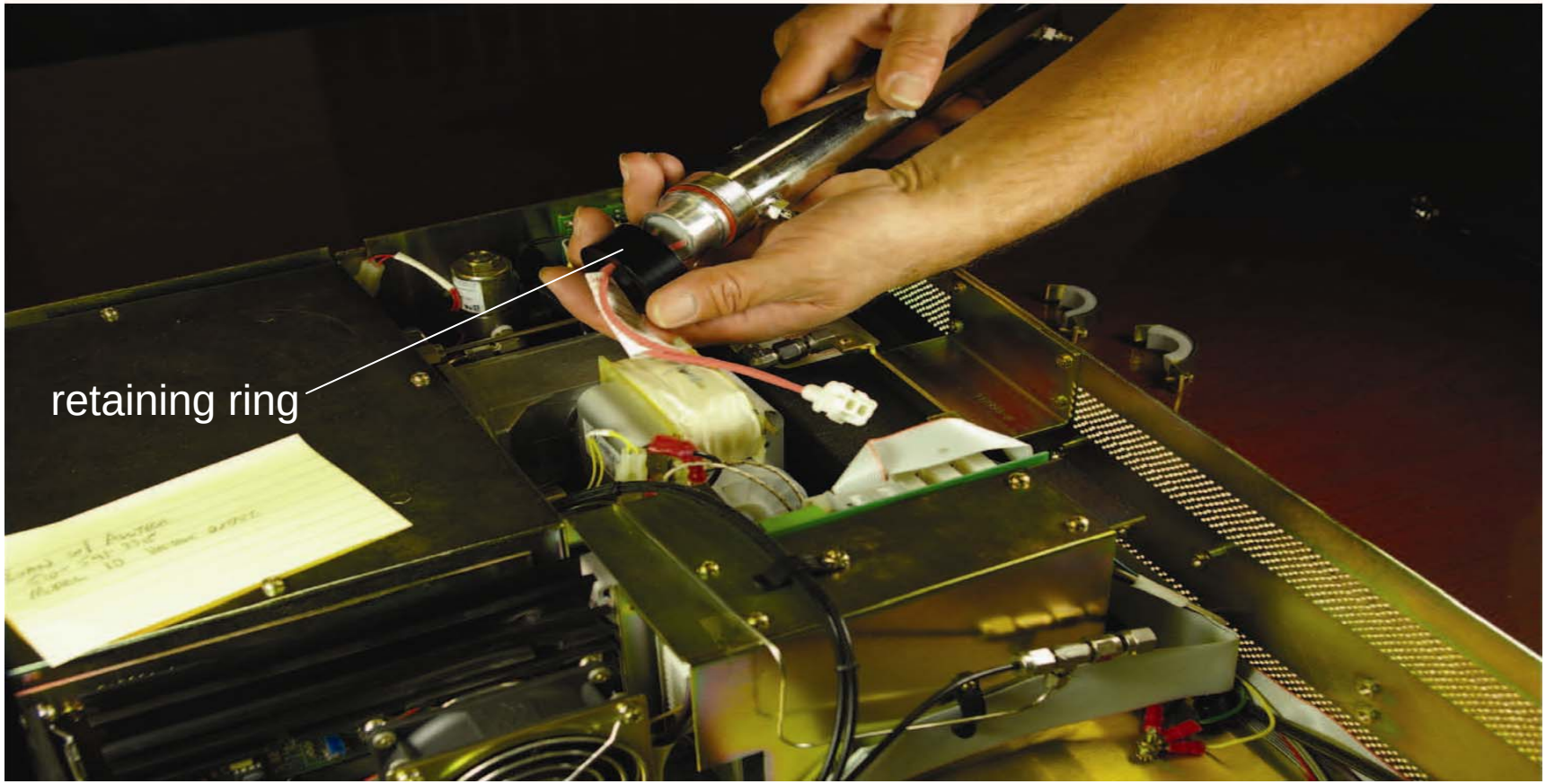
While squeezing the two locking tabs together, separate the connector



Lift out the lamp housing

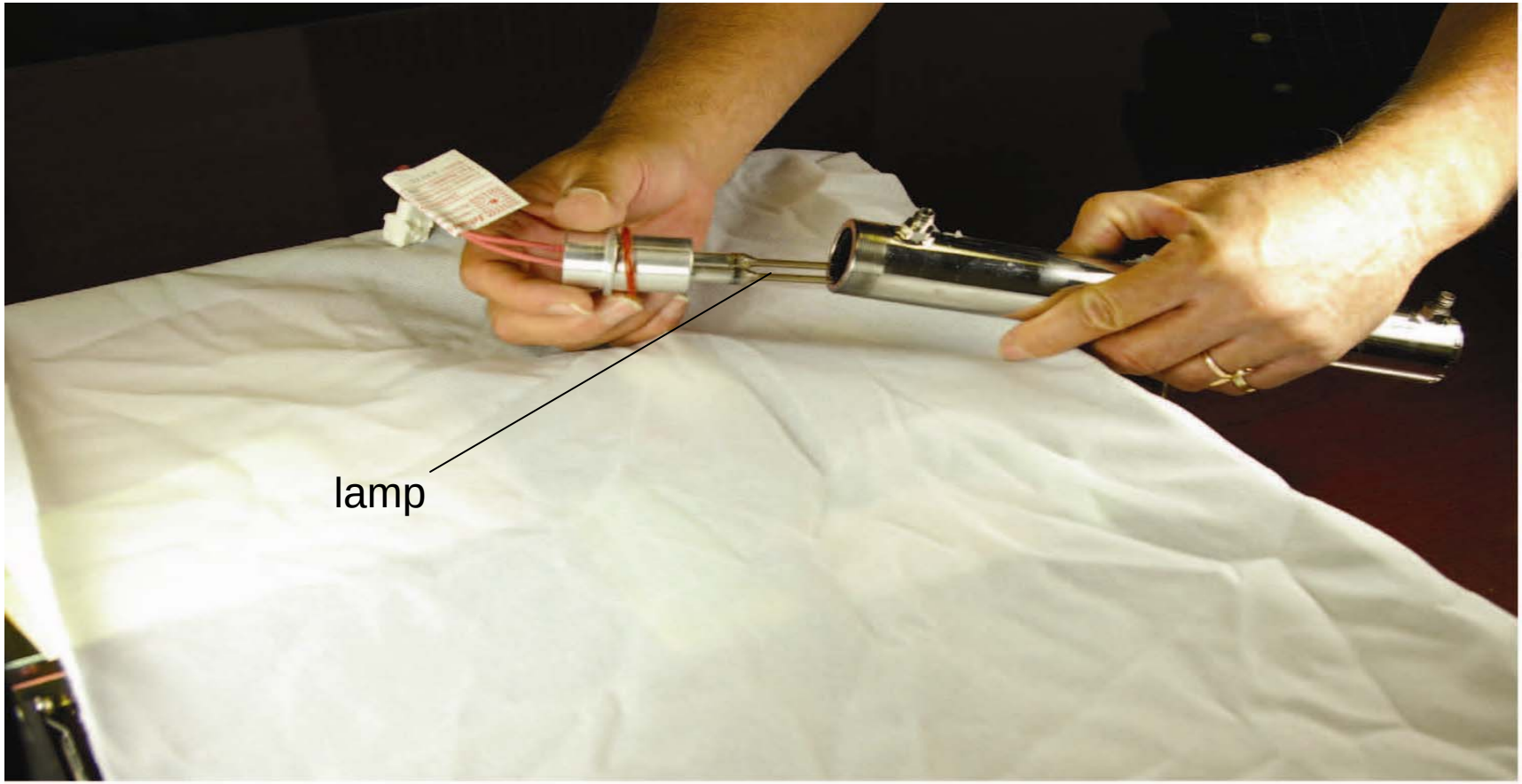


With the lamp housing out, unscrew the black retaining ring



Gently remove the lamp from the housing

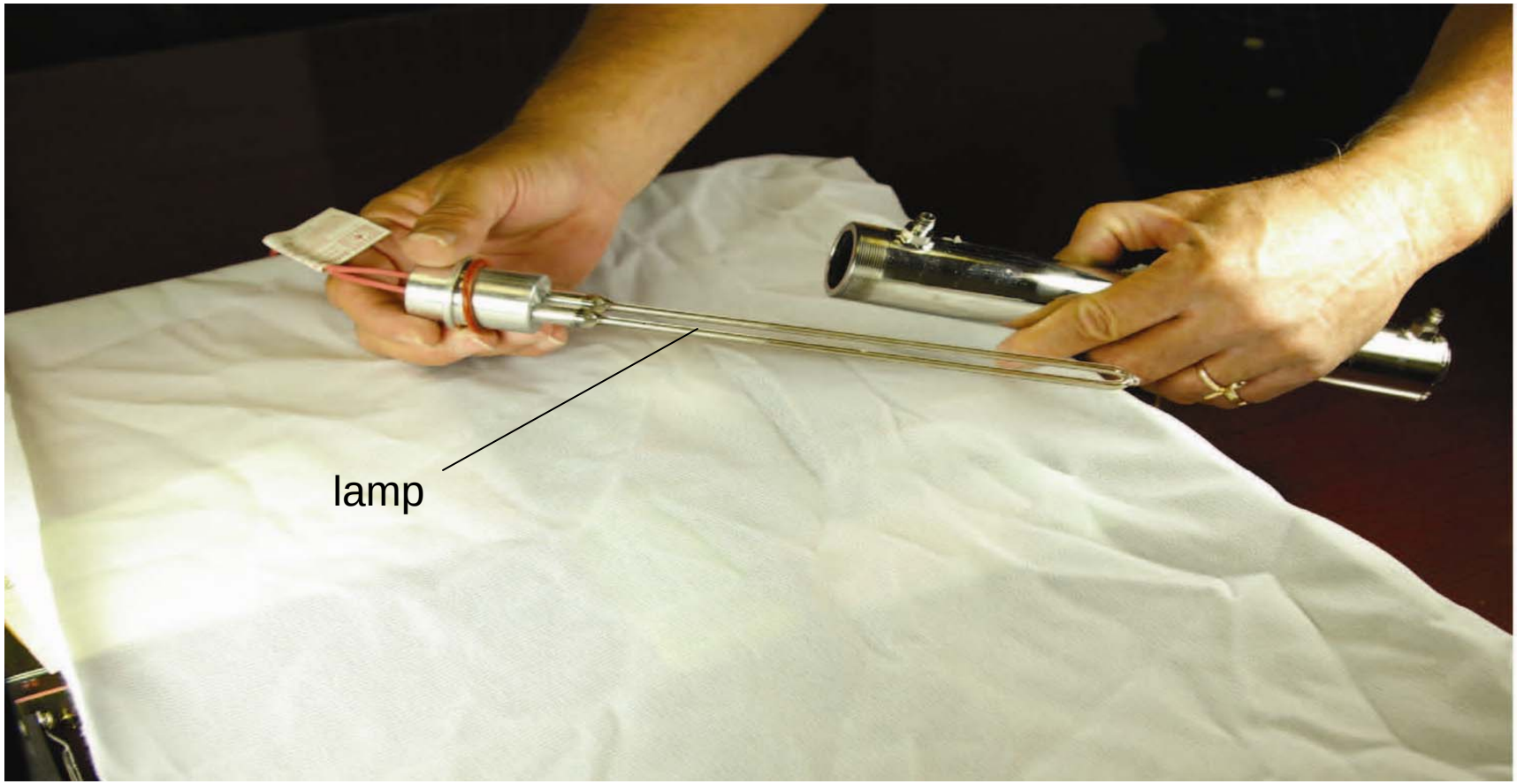
Because of oils on skin, do not touch lamp with bare hands



CAUTION—Do not break the lamp it contains MERCURY!

Reassemble lamp and housing in reverse order.

Because of oils on skin, do not touch lamp with bare hands



Make sure to align long tube with the inlet and outlet fittings

5. Cleaning Reaction Chamber

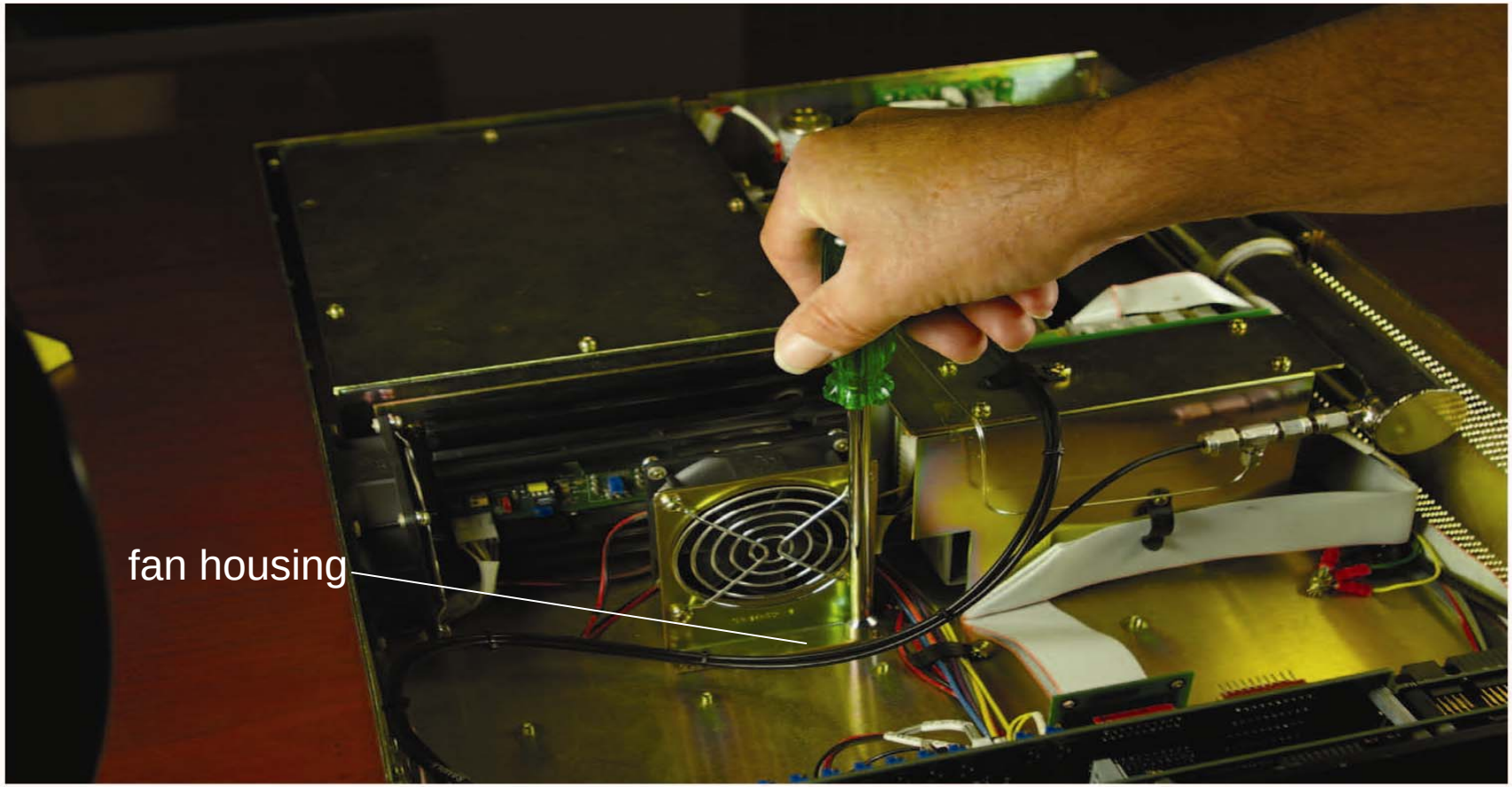
400/600 CLD/HCLD

MEASUREMENT CHAMBER CLEANING

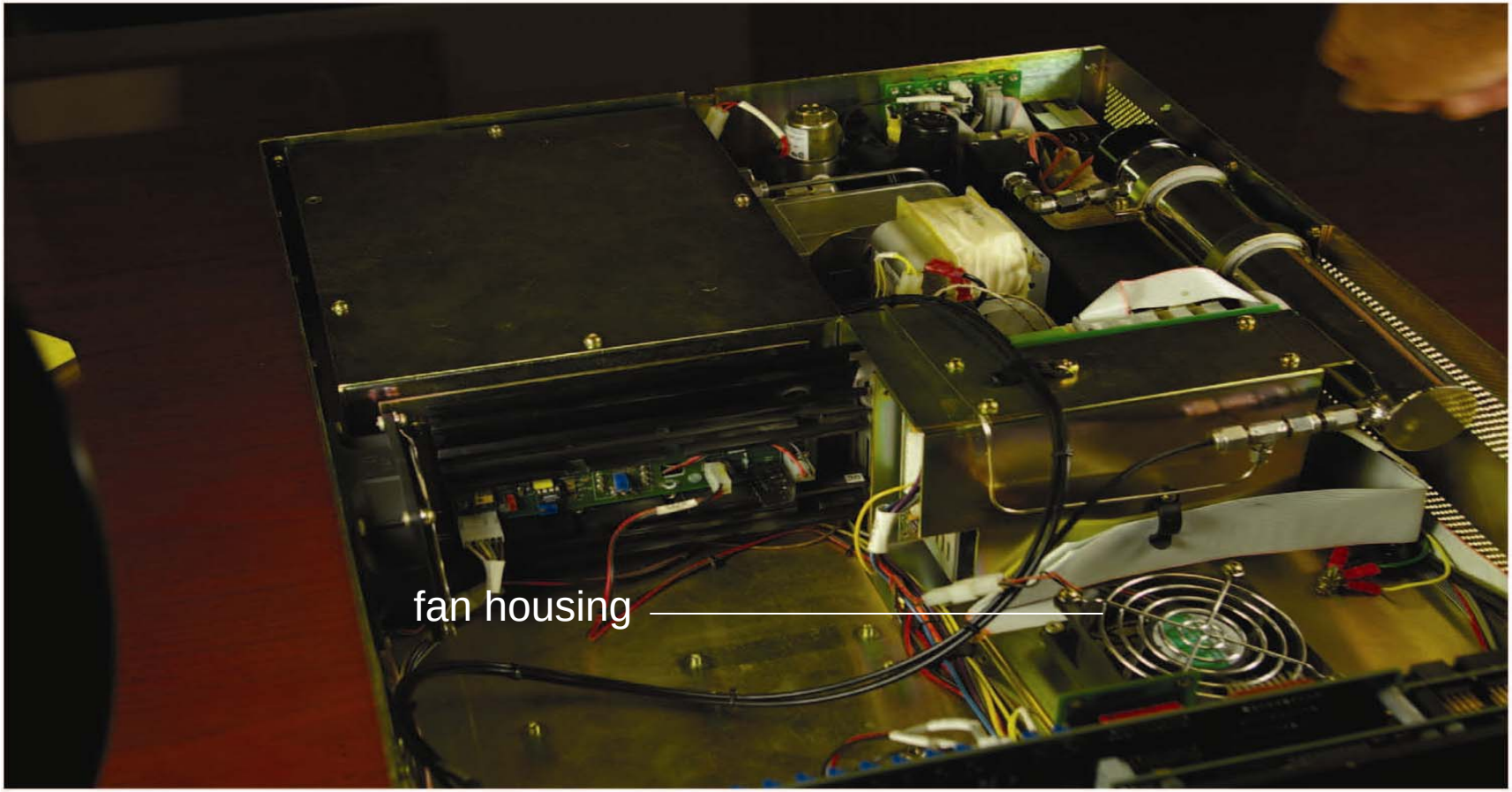
SAFETY INSTRUCTIONS

- Before Working on Analyzer
  - Remove Power Connections
- Proper Safety Procedures Must Be Observed At All Times

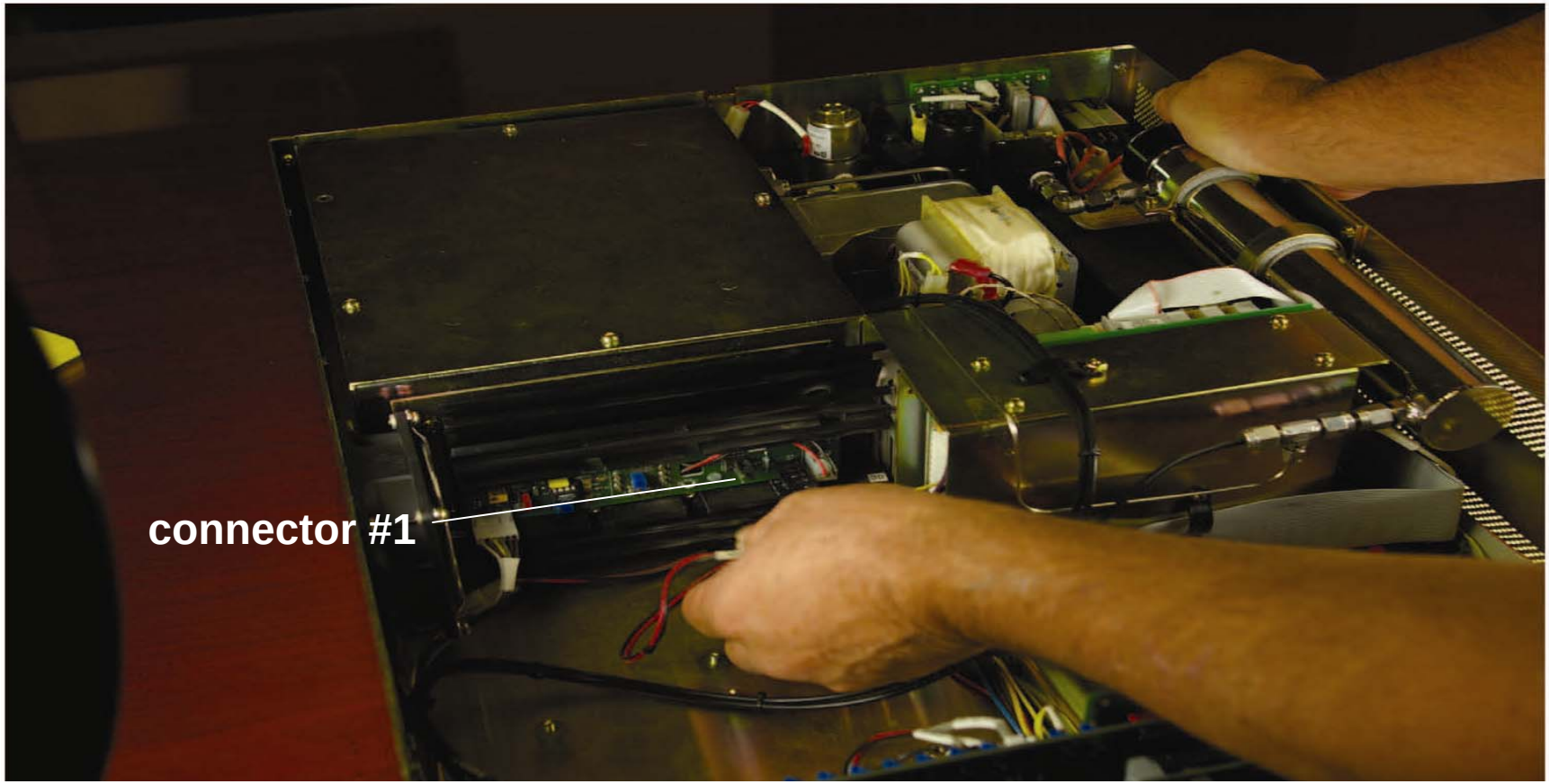
Using a 11/32” nut driver, remove the nuts securing the fan housing



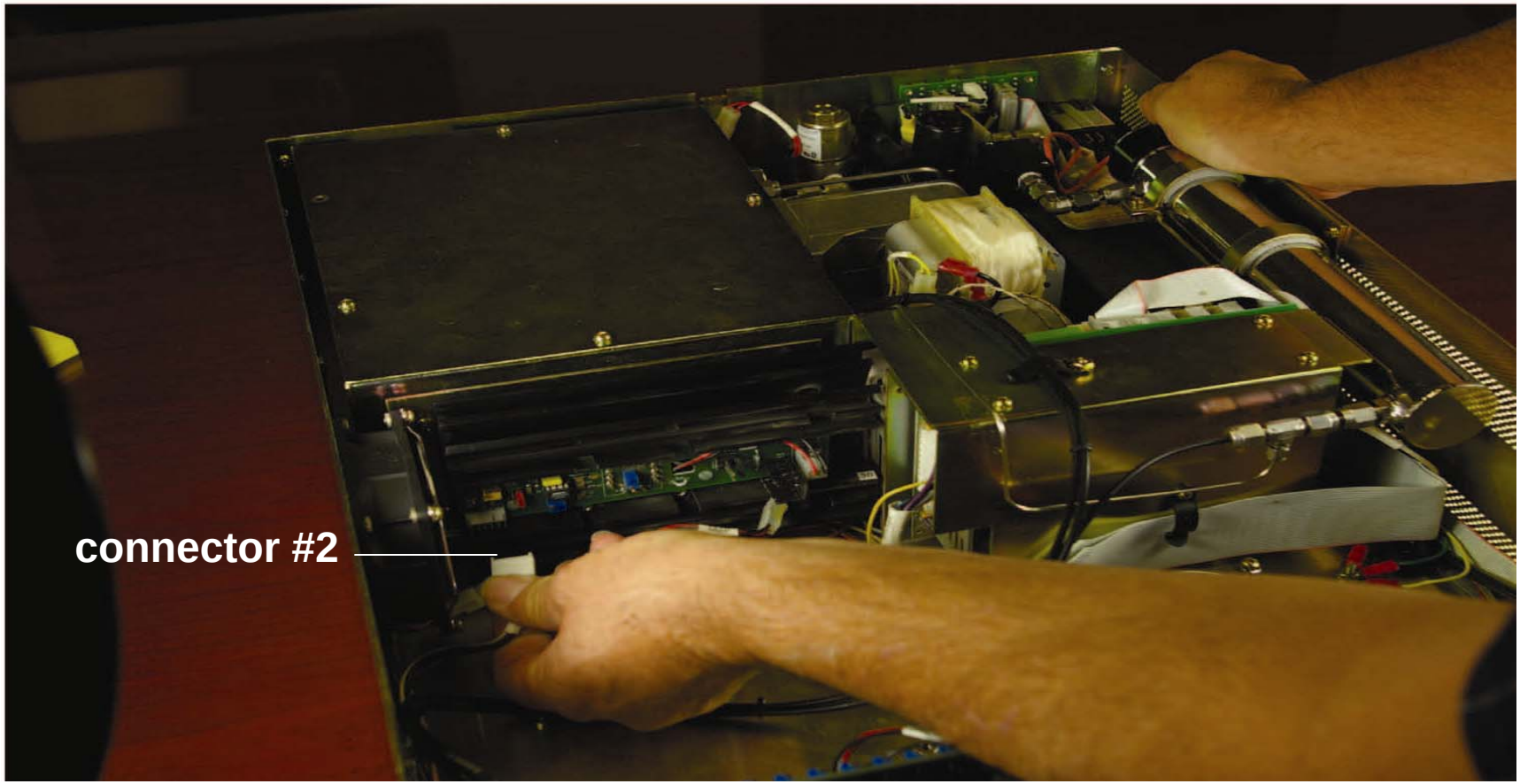
Set fan and fan housing aside



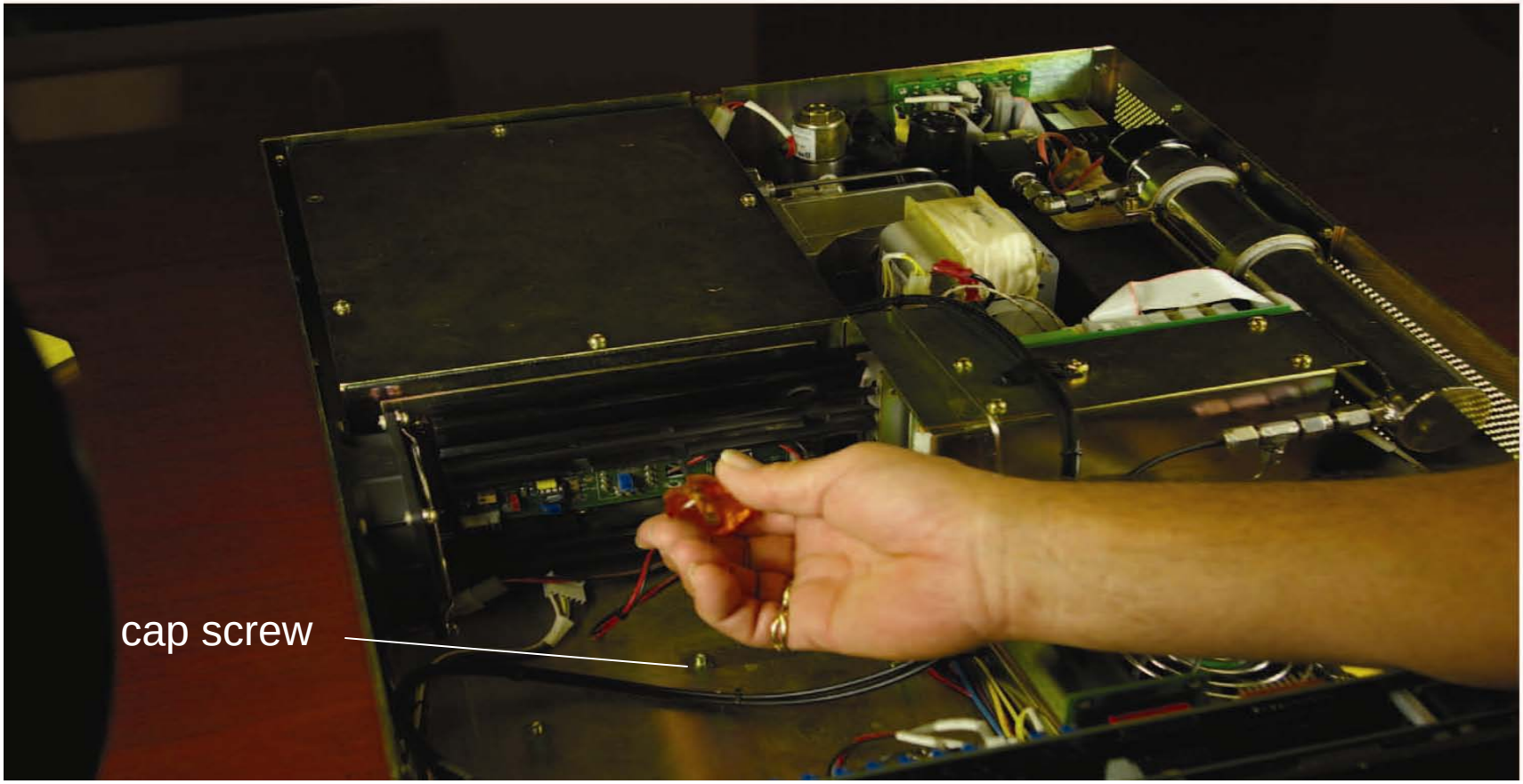
1. Remove the two power connectors from the detector board
NOTE: The connectors are keyed to ensure easy re-installation



1. Remove the two power connectors from the detector board
NOTE: The connectors are keyed to ensure easy re-installation

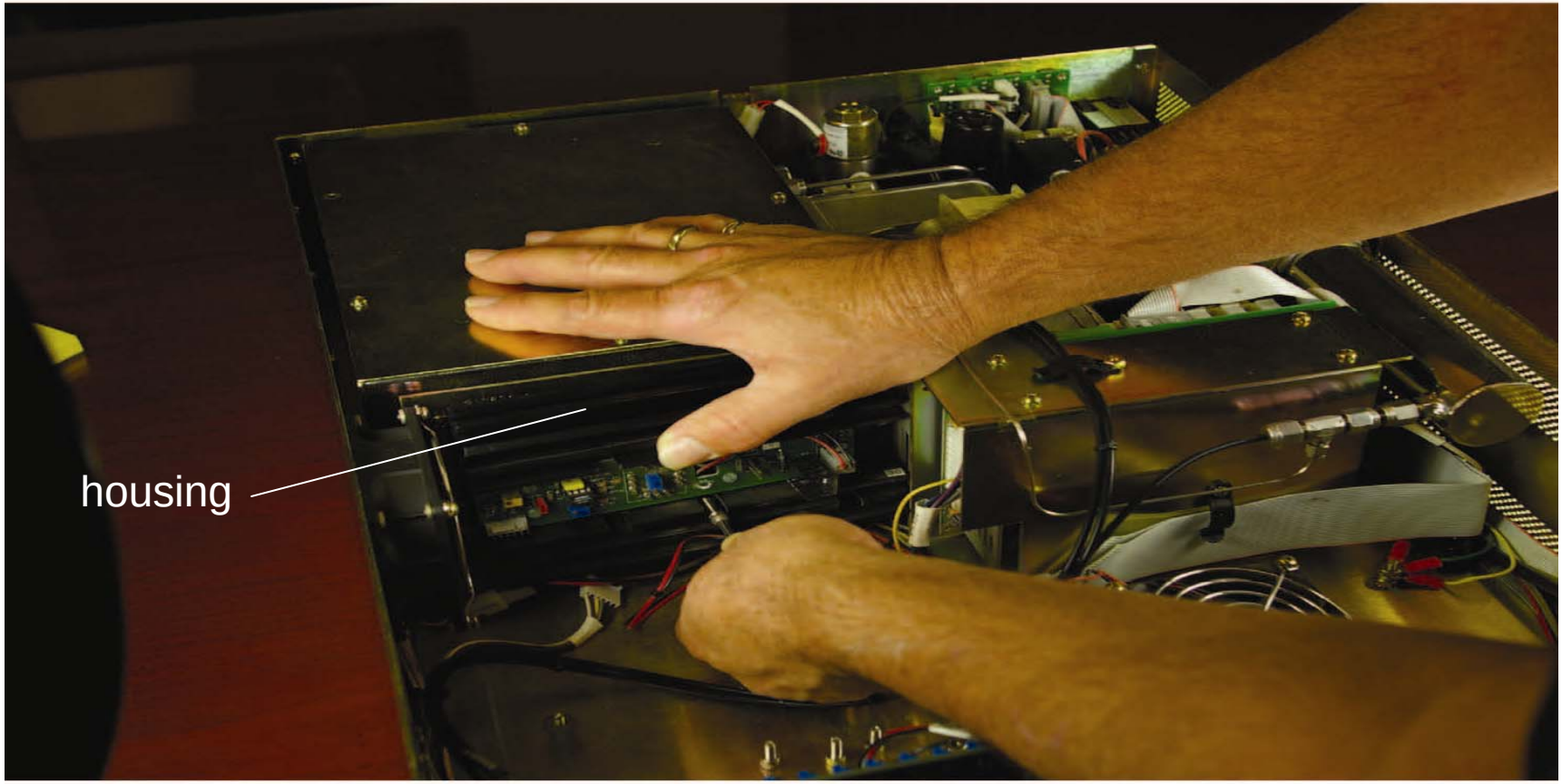


Using a 9/64th" Allen key remove the four cap screws holding the black heat sink and detector board

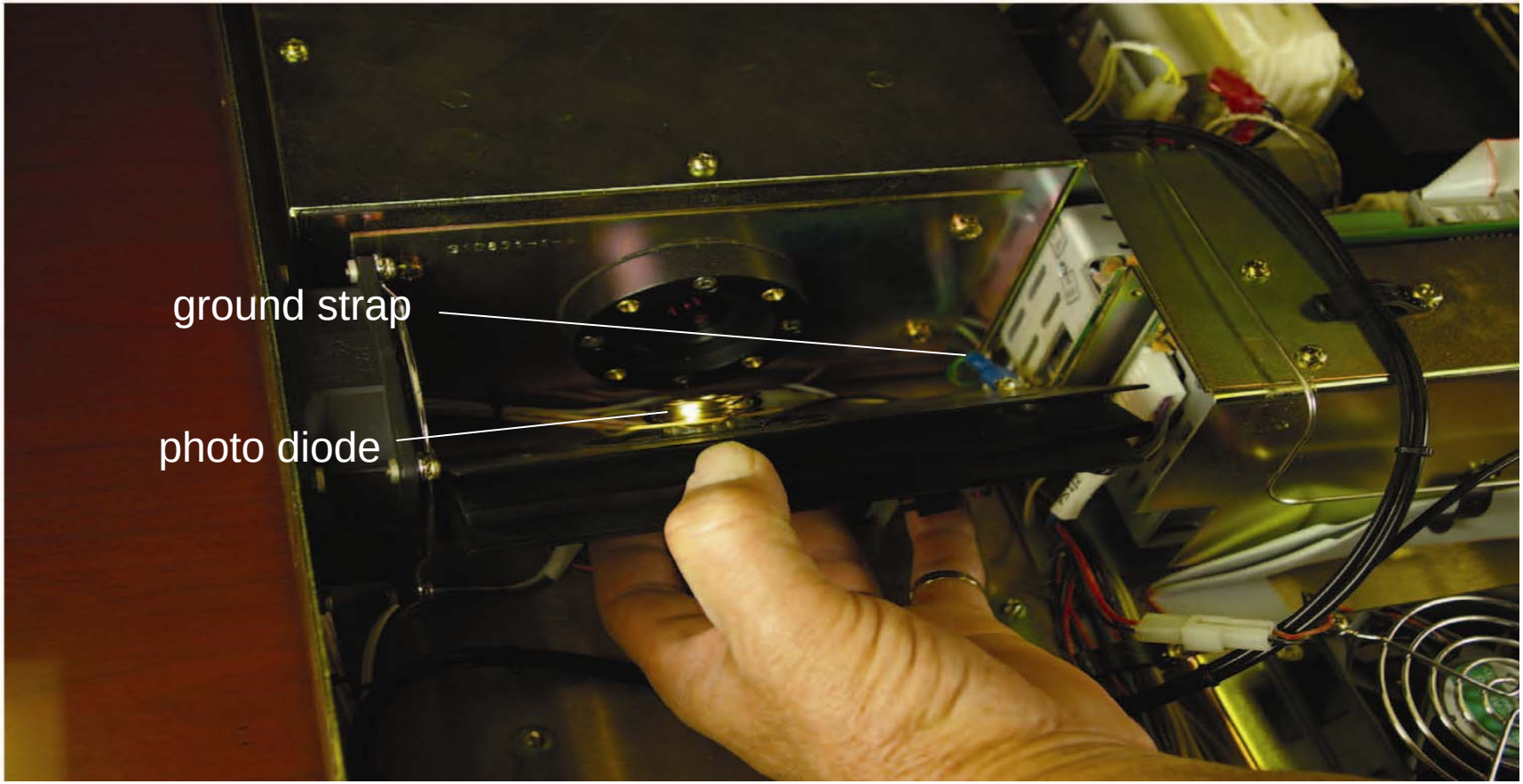


Maintain pressure against the housing while taking off the last cap screw because the assembly is slightly spring loaded—(see picture next page)

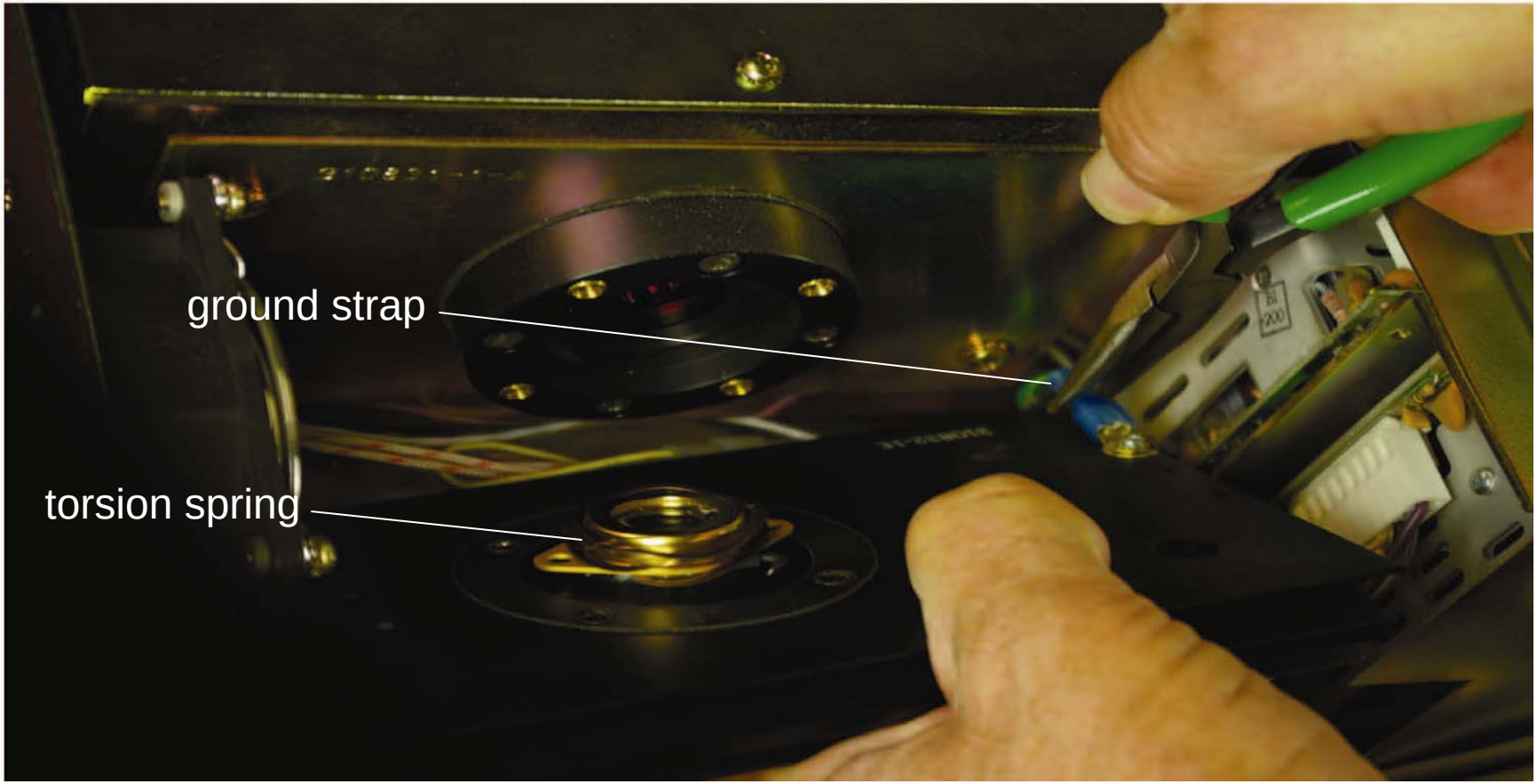
Maintain pressure against housing while taking off the last cap screw because the assembly is slightly spring loaded



Gently rotate the detector assembly back exposing the photo diode and ground strap

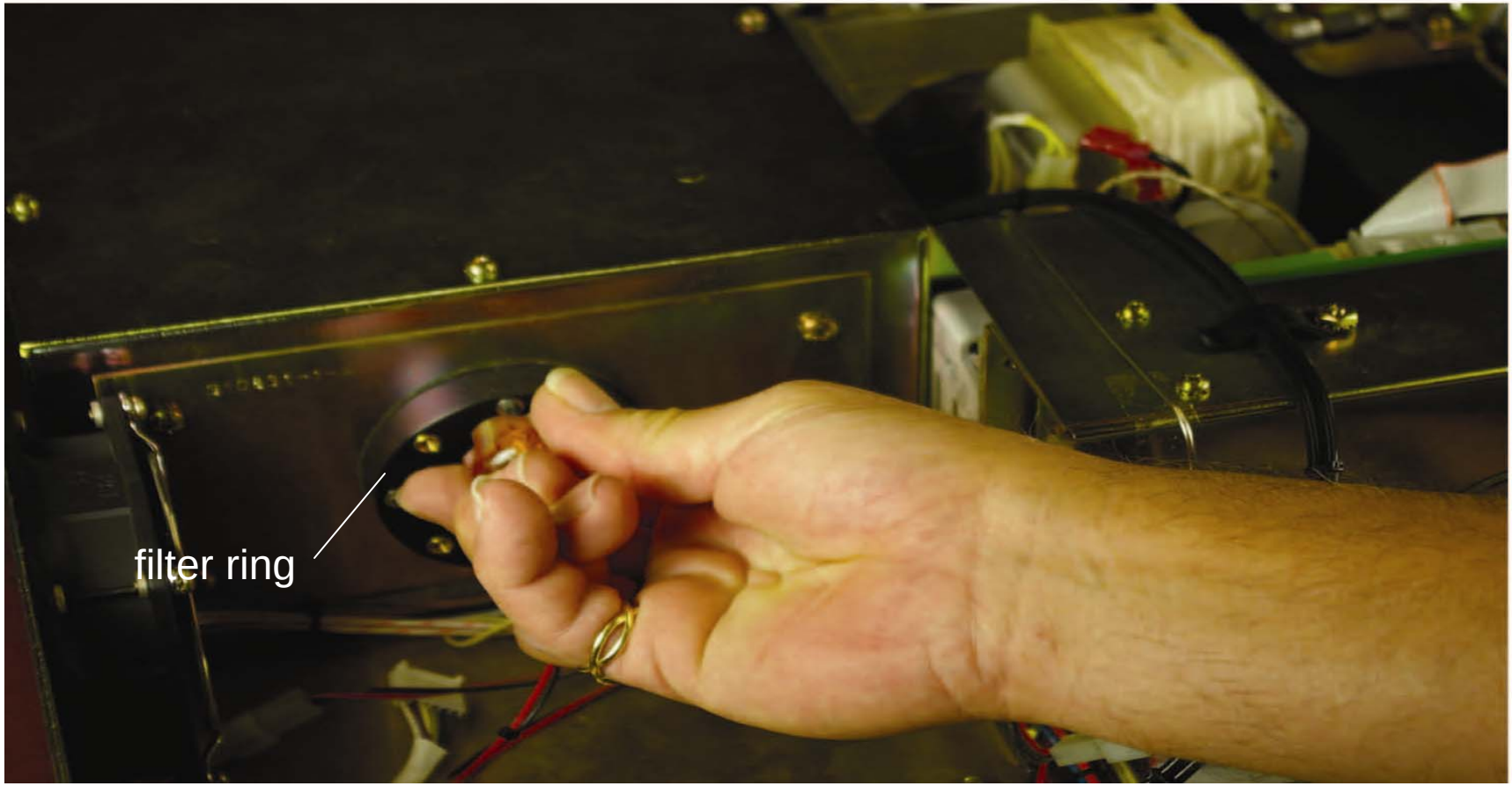


Using needle nose pliers remove ground strap and set detector assembly aside



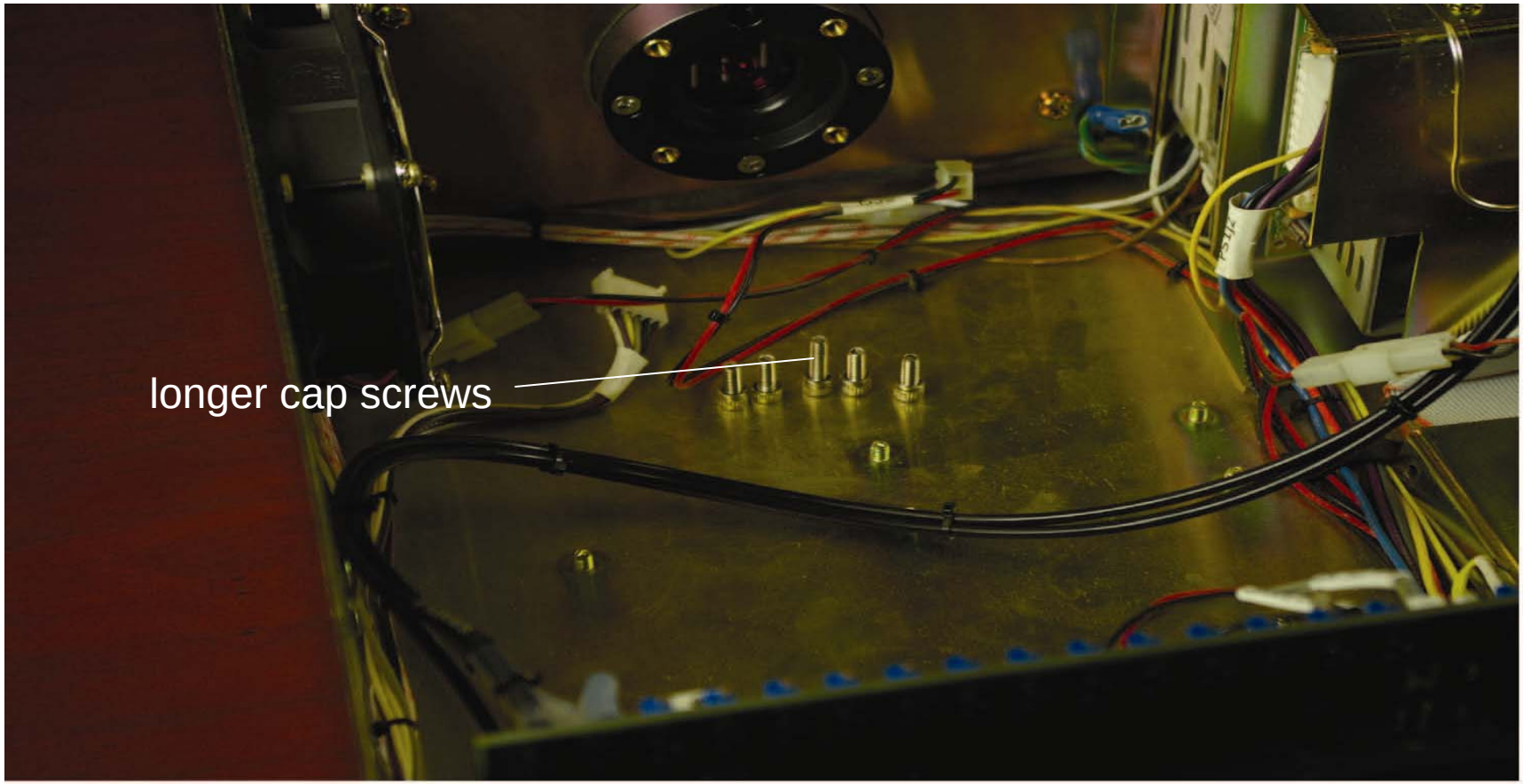
Be sure not to lose the flat torsion spring on the detector diode housing

Using a 9/64th”Allen key remove two opposing cap screws holding the filter ring

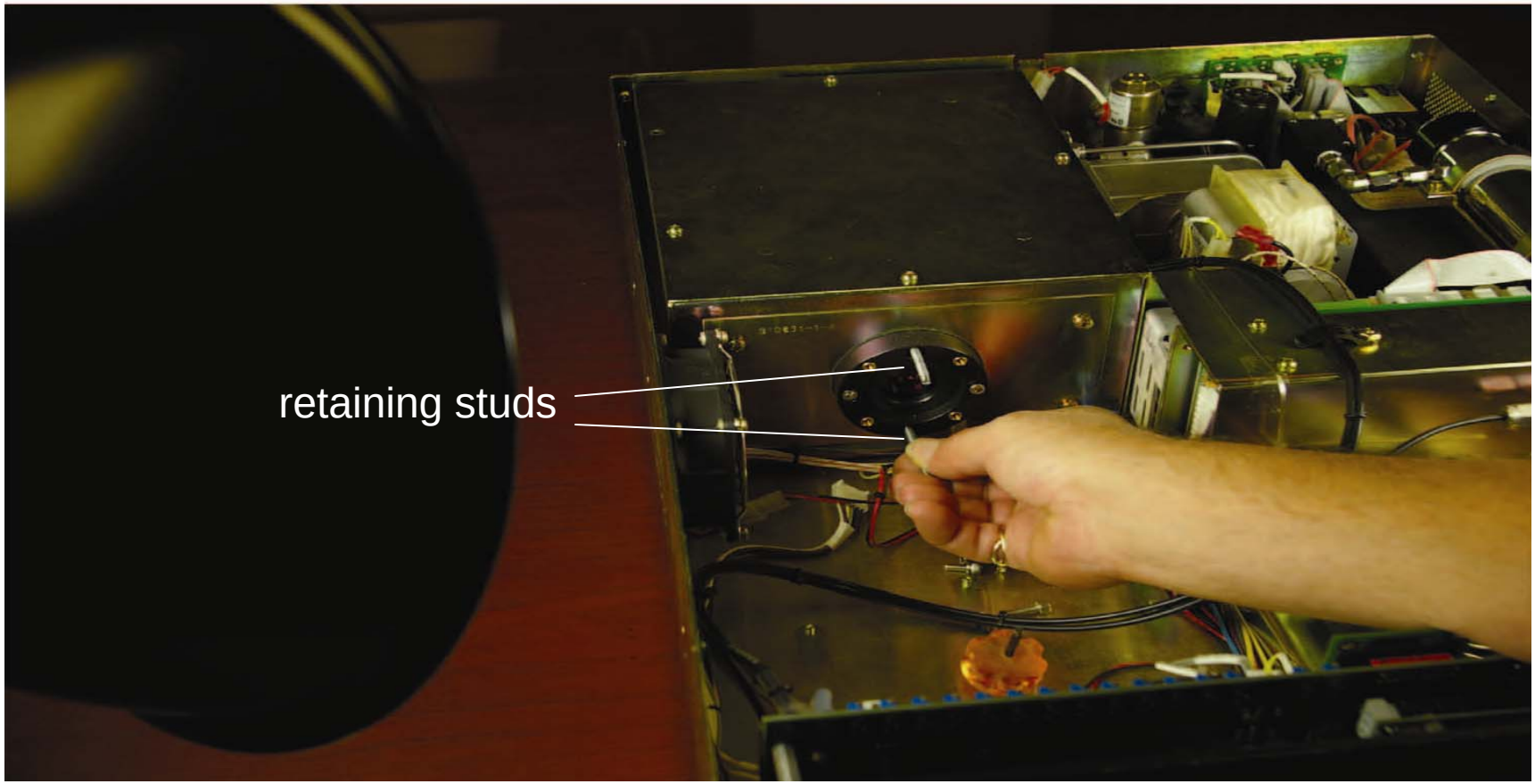


The cap screws are slightly longer for the filter housing ring than the detector housing

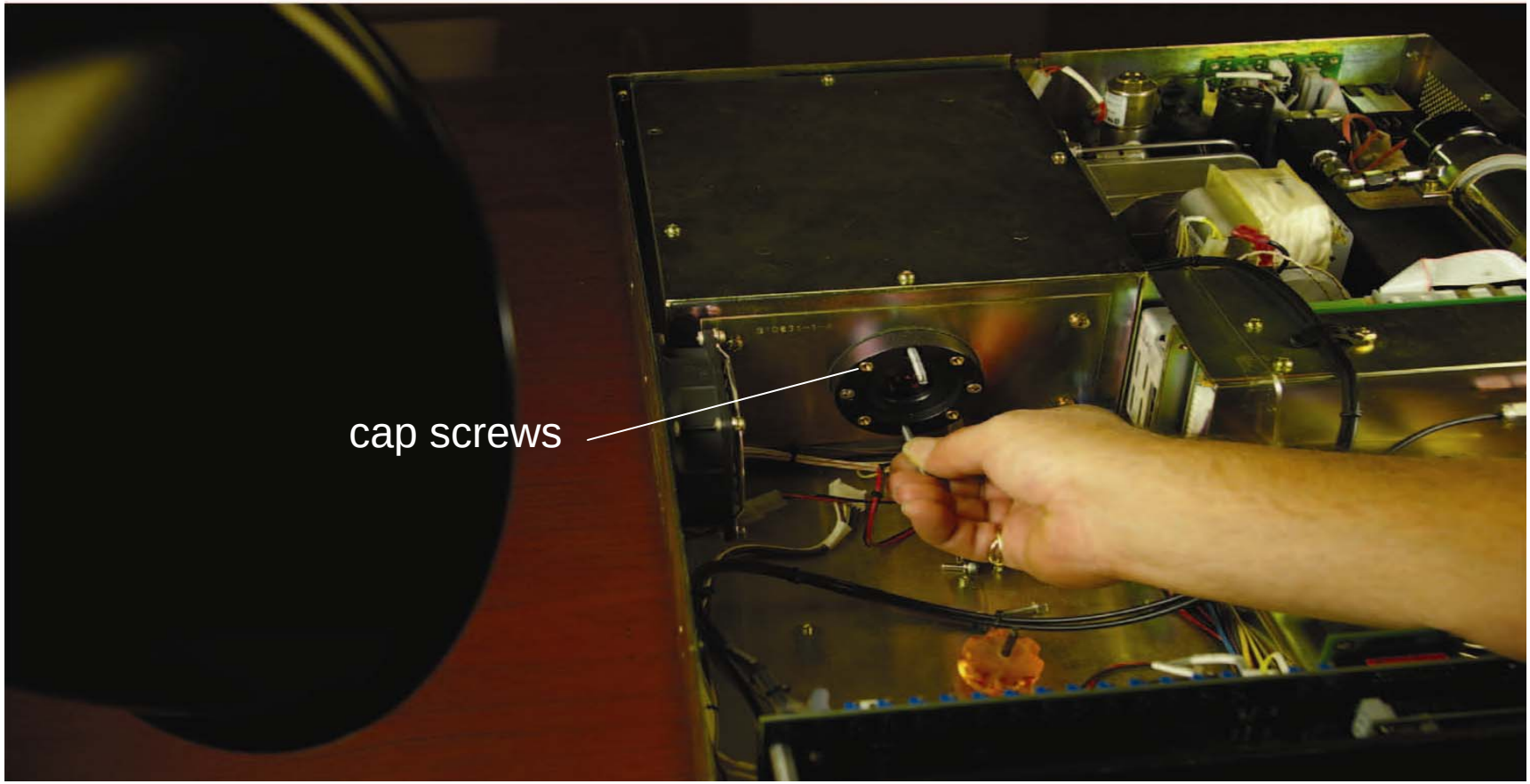
The cap screws are slightly longer for the filter housing ring than the detector housing



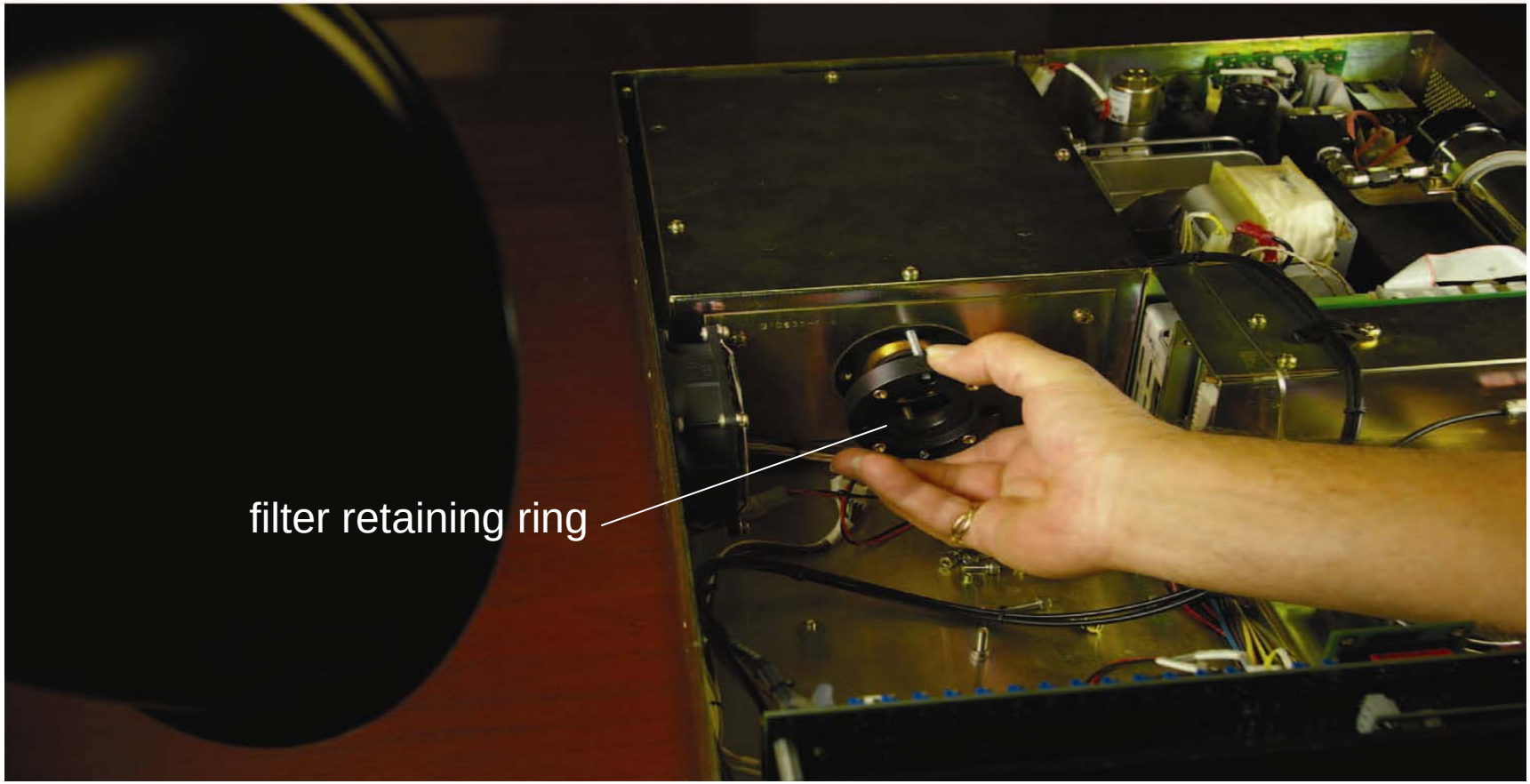
Insert two retaining studs. This prevents the measuring chamber from disconnecting from the chamber mount.



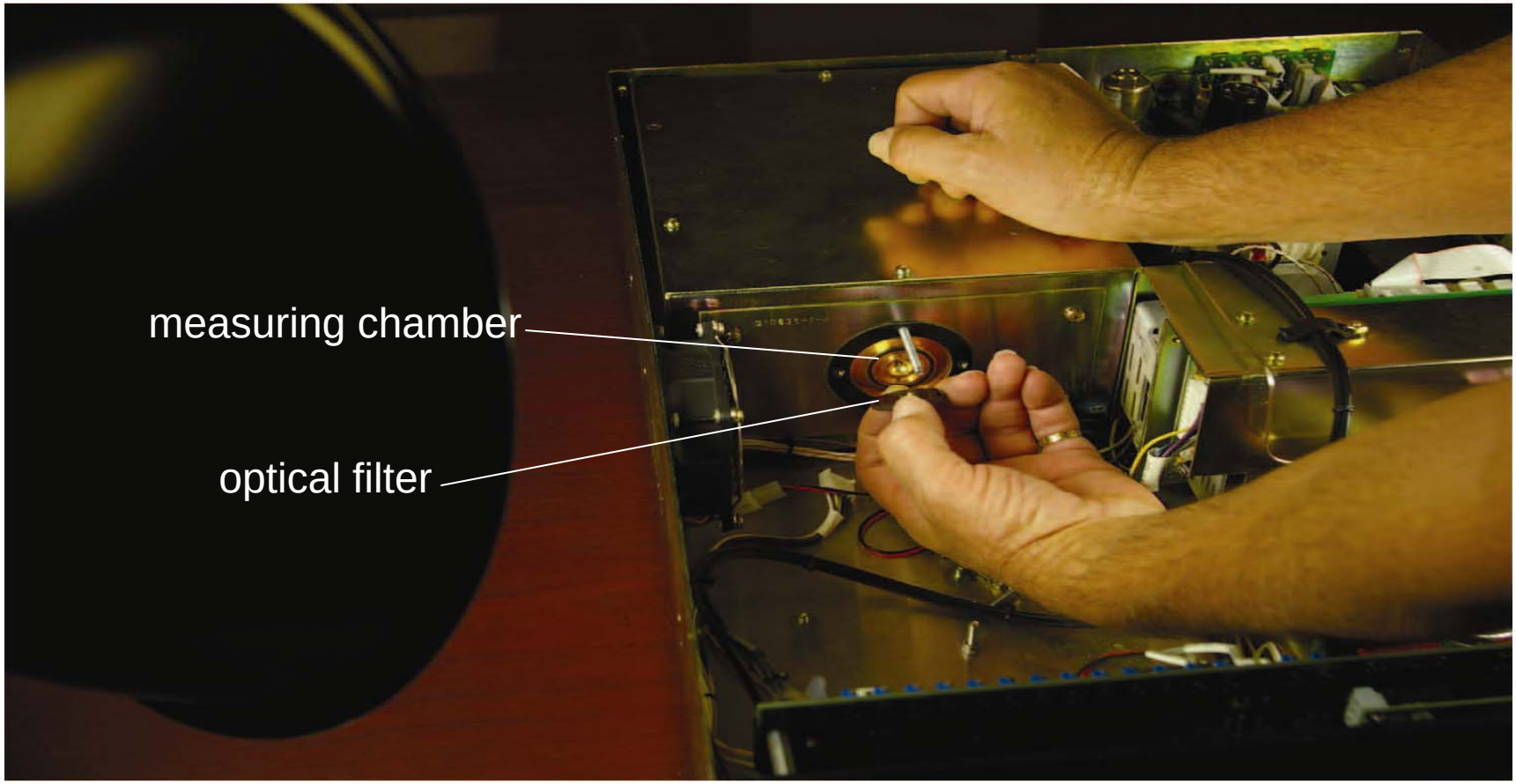
Remove the remaining cap screws



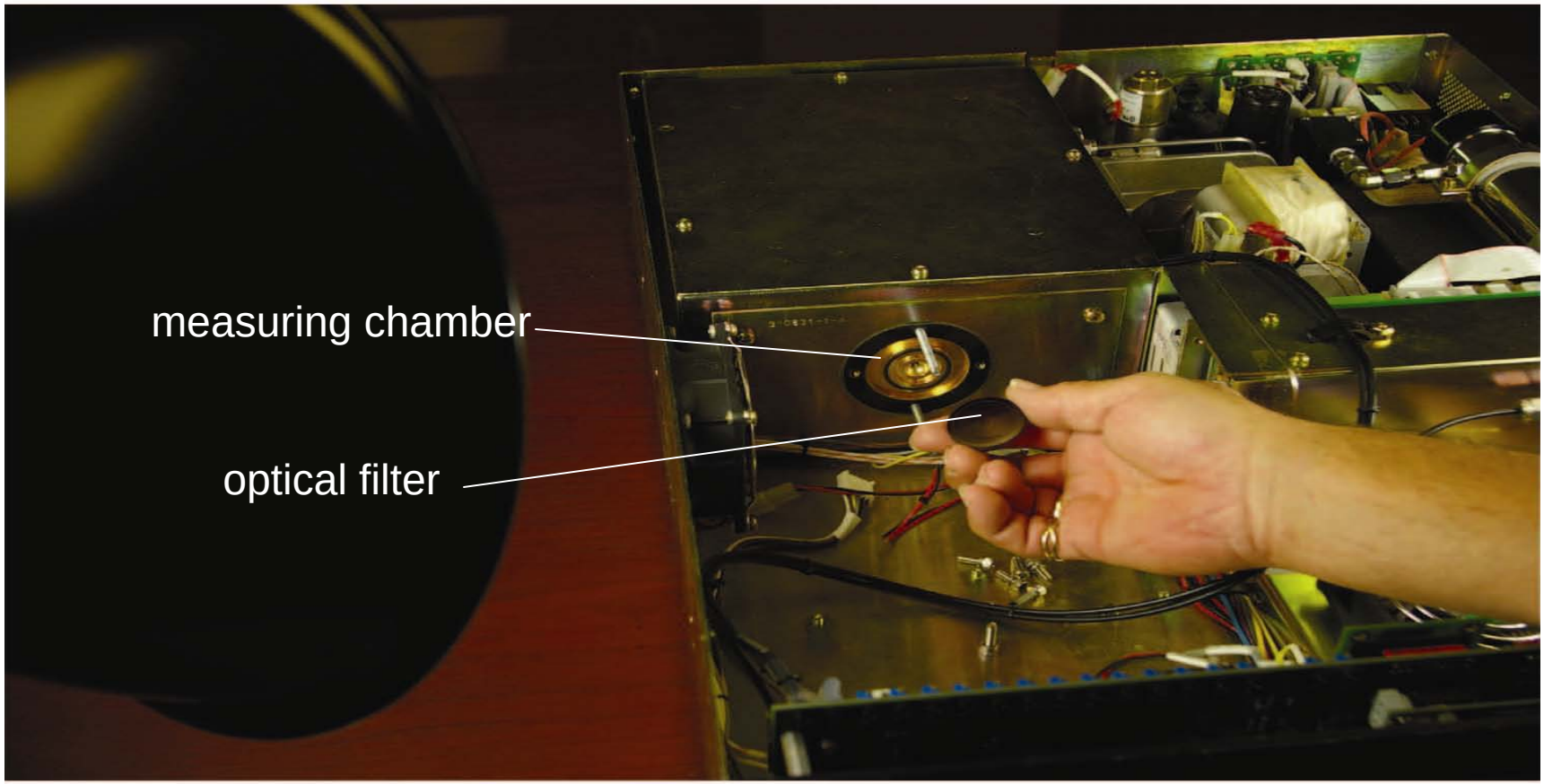
Gently remove the filter retaining ring and set aside



Remove the optical filter exposing the measuring chamber



Set optical filter aside for cleaning

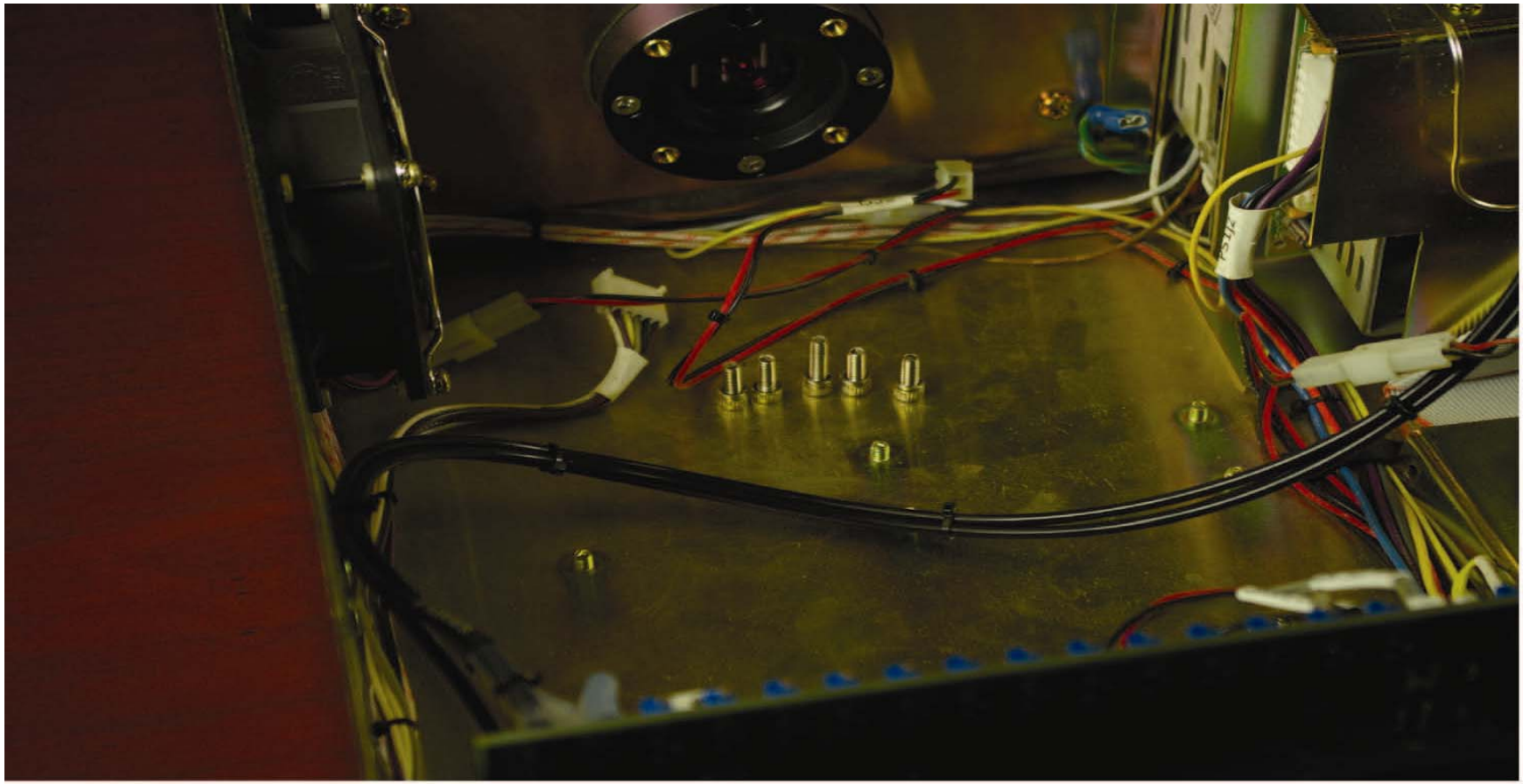


Using Isopropyl alcohol (or soap and water)+ Q-Tips (or soft cloth) thoroughly clean any deposits from the surface of the optical filter

Clean reflective surface of the measuring chamber.

Take care not to damage the sample capillary in the center of the chamber

Reassemble all components in reverse order



Make sure to use the longer cap screws for the filter retaining ring

Section VI

Drawings

1. Assembly Drawings, Mechanical

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
A	ADDED 110697-1, 110775-1, 110815-1 AND 311067-2 AND 873800, DELE 311003-2, 311003-1 (6.25") CHANGED TO 3 PLCS, REV/REDWN	GZG	6-26-03	GD
B	P/L, ITEM NO.12, P/N WAS: 310985-1, DESCRIPTION WAS: PANEL FRONT 600-CLD	MD	8-16-05	GD
C	ADDED NEW PARTS	MD	9-13-07	GD

* NOTE:

CUTTING INSTRUCTIONS: 3 EA @ 6.25"; 2 EA @ 4".

QTY REQD		PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
4		688203	SCREW PHS NYLON 4-40 X 1/4		23
3		649205	SCREW PH SEMS YL 4-40 X 3/8		22
4		649203	SCREW PH SEMS YL 4-40 X 1/4		21
4		625507	SCREW FH 100° 10-32 X 1/2		20
1		410832-1	DISPLAY LCD 600 SERIES		19
1		311600-1	PANEL FRONT 600 SERIES		17
1		311067-2	BRACKET MTG F/P 600 BOTTOM		16
27"		311003-1	TAPE COPPER CONDUCTIVE 1/2"	* SEE NOTE	15
4		310290-6	SPACER NYLON 1/40D X .312L #4		14
6		310211-7	STANDOFF F/F ALUM 4-40 X 3/16		13
2		310211-5	STANDOFF F/F ALUM 4-40 X 3/4		12
2		310100-2	HANDLE ANALYZER BLACK P/C		11
1		310020-17	STANDOFF M/F ALUM 4-40 X 1/2-L		10
2		310020-16	STANDOFF M/F ALUM 4-40 X 13/32		9
2		310020-9	STANDOFF M/F ALUM 4-40 X 3/4		8
4		310020-4	STANDOFF M/F NYLON 4-40 X 1/2		7
1	A	110927-1	ASSY BOARD BATTERY 600 SERIES		6
1	B	110924-1	ASSY BOARD CPLD 600 SERIES		5
1	D	110920-1	ASSY BOARD MAIN CPU 600 SERIES		4
1		110895-1	ASSY CPU 600A-SERIES		3
1		110815-2	ASSY CABLE MAIN/CPU 600 SERIES		2
1	D	110775-1	ASSY BOARD MAIN 600 NOX		1

PART LIST

QTY REQD		PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
1		873800	NUT HEX KEPS YL 6-32		27
2		872800	NUT HEX KEPS YL 4-40		26
3		862600	NUT HEX NYLON 4-40		25
22		812600	WASHER FLAT NYLON #4		24

PART LIST

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USED ON

APPROVALS	DATE
DRAWN G. GRISETA	4-5-02
CHECKED G. DEMINT	4-5-02
ISSUED G. GRISETA	4-5-02

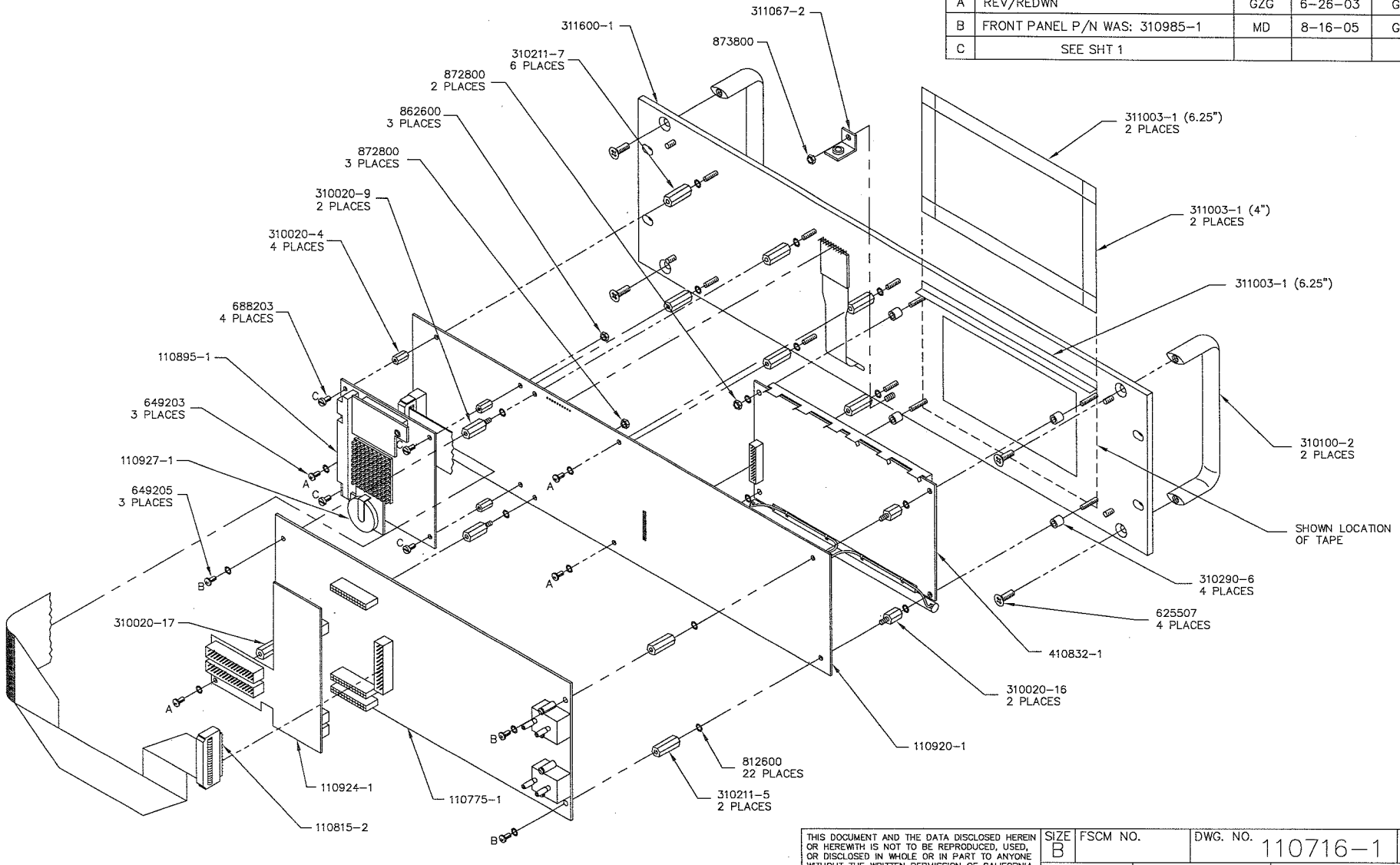
CAI

ASSY PANEL, FRONT 600-CLD

SIZE B | FSCM NO. | DWG. NO. 110716-1 | REV. C

SCALE - | SHEET 1 OF 2

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
A	REV/REDWN	GZG	6-26-03	GD
B	FRONT PANEL P/N WAS: 310985-1	MD	8-16-05	GD
C	SEE SHT 1			



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SIZE	FSCM NO.	DWG. NO.	REV.
B		110716-1	C
SCALE 3/8		SHEET 2 OF 2	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
B	ADDED REV LETTERS TO DESCRIPTION	GZG	6-16-03	GD

QTY REQD		PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
4		840800	WASHER LOCK INT TOOTH 7/16 YL		19
2		649503	SCREW PH SEMS YL 10-32 X 1/4		18
4		649303	SCREW PH SEMS YL 6-32 X 1/4		17
4		649203	SCREW PH SEMS YL 4-40 X 1/4		16
1		410753-1	CONN AMP MOD COUPLER 8 PIN		15
2		310998-1	SCREWLOCK FEMALE 4-40 X .250		14
1		310897-1	PANEL REAR 600-CLD		13
1		310893-1	MANIFOLD BYPASS HCLD		12
1		310837-1	BRACKET FILTER TEE		11
1		310335-1	FILTER "T" 7 MICRON 1/8T		10
1		310227-1	FILTER IN-LINE SCREEN 10 UM		9
1		310176-2	BULKHEAD UNION SS 1/4T-1/4T		8
2		310151-1	BULKHEAD FEM SS 1/4T-1/8 NPT		7
2		310045-4	ELBOW MALE SS 1/8T-1/8 NPT		6
2		300979-1	PLUG HOLE 7/16" BLACK		5
4"		300220-9	TUBING FEP BLK .125 OD X .031 W		4
1	A	110792-5	ASSY CABLE PWR ENT 600-CLD		3
1	A	110748-2	ASSY BOARD TERM BLOCK DUAL		2
1	B	110712-1	ASSY CABLE SERIAL 600 SERIES		1

PART LIST

USED ON

CAI

APPROVALS	DATE
DRAWN G. GRISETA	4-19-02
CHECKED G. DEMINT	4-19-02
ISSUED G. GRISETA	4-19-02

ASSY PANEL REAR 600-CLD

SIZE B | FSCM NO. | DWG. NO. 110715-1 | REV. B

SCALE 1/2 | SHEET 1 OF 2

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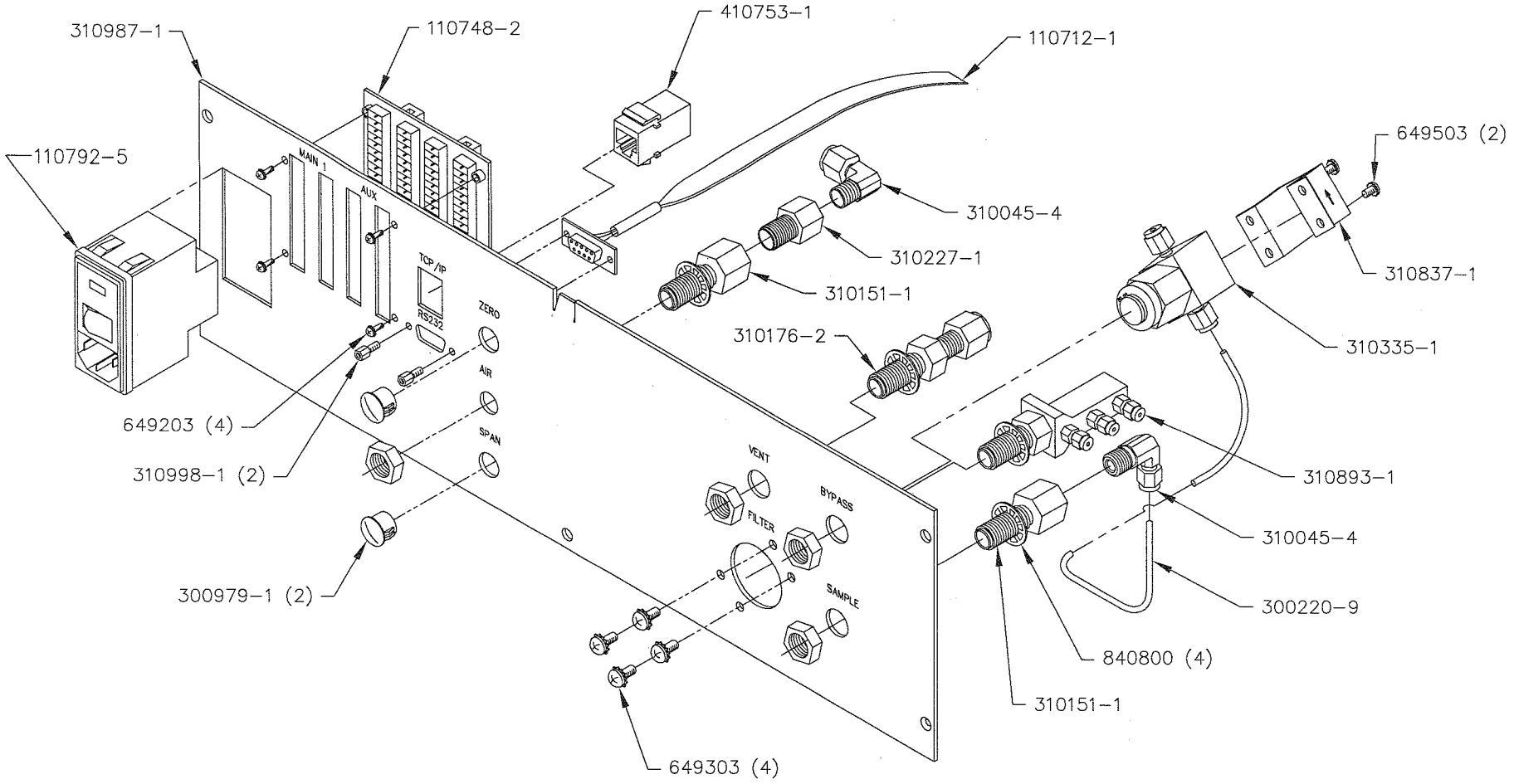
REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
B	SEE SH'T 1, REV/REDWN	GZG	6-16-03	GD



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SIZE	FSCM NO.	DWG. NO.	REV.
B		110715-1	B
SCALE 1/2		SHEET 2 OF 2	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	REVISED & REDRAWN	GZG	8-27-03	GD
D	SHT 1, BOM, ITEM NO. 1, REV. WAS: C, PART NO. WAS: 110548-4. ITEM NO. 2, PART NO. PART NO. WAS: 110548-2, DESCRIPTION WAS: ASSY---DET (30), ADDED, SEE CHART TO SPEC., ITEM NO. 20, PART NO. WAS: 310887-1, ITEM NO. 34 QTY. WAS: 1, ITEM NO. 25 WAS: 410216-3 AND ITEM NO. 33 WAS: 645203. SHT 2, ADDED CHART, P/N WAS: 110548-4, ADDED TRANSISTORS TO BOARD	MD	9-01-05	GD

QTY REQD	REV	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
12		894100	WASHER LOCK SPLIT SS #8 CAP		38
4		688203	SCREW PHS NYLON 4-40 X 1/4		37
4		661409	SCREW SKHC SS 8-32 X 5/8		36
8		661406	SCREW SKHC SS 8-32 X 7/16		35
2		645203	SCREW PH SEMS 4-40 X 1/4		34
1		645103	SCREW PH SEMS 2-56 X 1/4		33
1		410830-2	JUMPER INSUL 18 AWG .200 (L)		32
1		410352-1	TERMINAL 45 DEG .187 TAB		31
1		410337-1	COOLER THERMOELECTRIC NOX DET		30
1		410310-3	PHOTO DIODE HCLD		29
1		410283-1	CABLE TIE BLACK SMALL		28
2		410240-2	CONN CRIMP .156 22-30 GA		27
1		410239-1	CONN MOLEX HOUSING .156 2 PIN		26
1		410044-1	HEAT SINK PAD TO-220		25
1		311070-1	SPRING WAVE SS PHOTODIODE		24
12		311004-1	INSULATOR PHOTO DIODE PINS TFE		23
1		310887-2	PAD THERMAL CONDUCT ADHESIVE		22
1		310887-1	PAD HEAT TRANSFER PHOTO DIODE		21
1		310883-1	INSULATOR SCREW TO-220 NYLON		20
1		310842-1	GASKET NOX DET LIGHT SEAL		19
2		310841-1	GASKET NOX DET HOUSING FOAM		18
1		310832-1	HEATSINK NOX DETECTOR		17
1		310831-1	PLATE MNTG NOX DETECTOR		16
1		310830-1	GASKET NOX DET CELL TEFLON		15
1		310827-1	GASKET NOX DET MANIFOLD TEFLON		14
1		310822-1	CELL MANIFOLD NOX DETECTOR		13
1		310821-1	CELL 10MM NOX DETECTOR		12
1		310820-1	CELL HOUSING NOX DETECTOR		11
1		310284-1	CONN MALE TC SS 1/8T-5/16 SAE		10
1		310081-1	O-RING VITON LONG PASS FILTER		9
1		310074-1	FILTER LONG PASS HCLD		8
1		310027-3	CONN MALE T/C SS 1/8T-1/8 NPT		7
1		310002-7	CONN MALE SS 1/4T-1/8 NPT		6
1		310002-4	CONN MALE SS 1/8T-1/16 NPT		5
4		301466-1	STAND HEX NYLON M-F 4-40 X 1/4		4
1		110569-2	ASSY NOZZLE OZONE NOX DET		3
1		110568	ASSY NOZZLE SAMPLE NOX DET	SEE CHART	2
1		110548-6	ASSY BOARD NOX DETECTOR		1

PART LIST

USED ON

CAI

APPROVALS	DATE
DRAWN G. GRISETA	8-27-03
CHECKED G. DEMINT	8-27-03
ISSUED G. GRISETA	8-27-03

ASSY DETECTOR
600-CLD

SIZE	FSCM NO.	DWG. NO.	REV.
B		110525-5,7,8	D

SCALE 1/1 SHEET 1 OF 3

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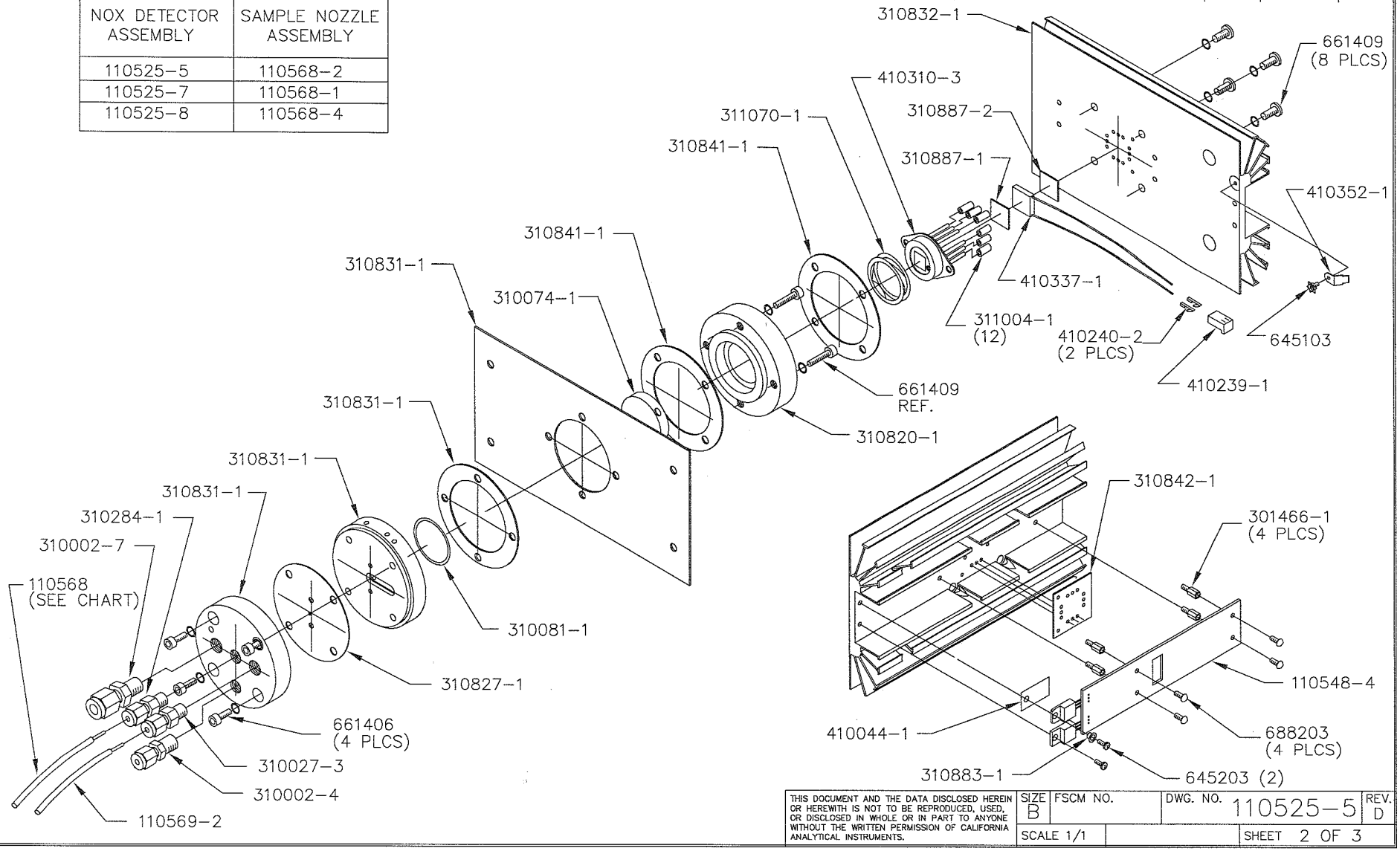
NOX DETECTOR ASSEMBLY	SAMPLE NOZZLE ASSEMBLY
110525-5	110568-2
110525-7	110568-1
110525-8	110568-4

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	REVISED & REDRAWN	DBW	8-27-03	G.D.



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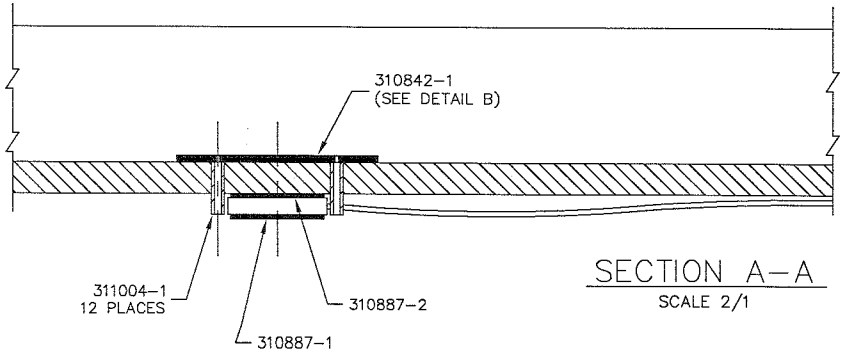
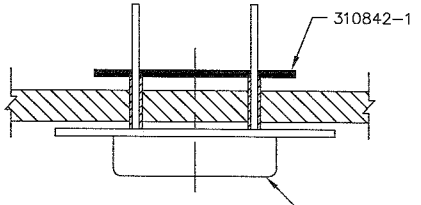
SIZE	FSCM NO.	DWG. NO.	REV.
B		110525-5	D
SCALE 1/1		SHEET 2 OF 3	

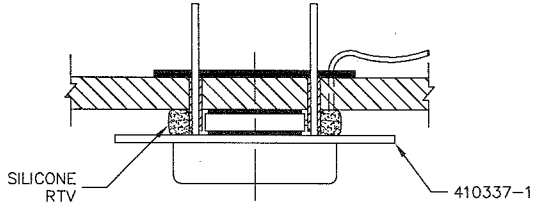
REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	REVISED & REDRAWN	GZG	8-27-03	G.D.



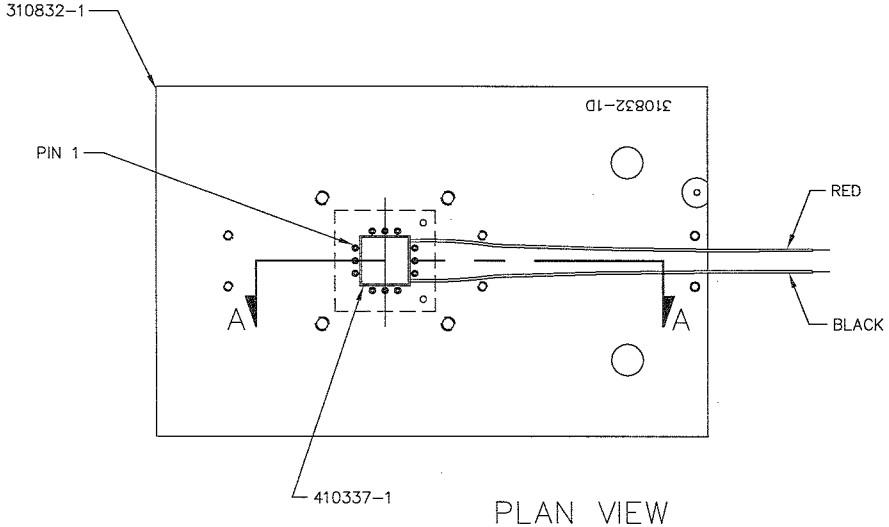
SECTION A-A
SCALE 2/1



DETAIL B
SCALE 2/1



DETAIL C
SCALE 2/1



PLAN VIEW

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SIZE	FSCM NO.	DWG. NO.	REV.
B		110525-5	D
SCALE 1/1		SHEET 3 OF 3	

QTY REQ'D	REV.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
1		310750-1	CLAMP NO/NOX VALVE OVEN HCLD		56
1		310692-1	BRACKET MOUNTING EPC VALVE		55
1		310509-1	LABEL SERIAL NUMBER CLD/HCLD		54
1		310316-1	COVER ANALYZER CASE 22"		53
2"		310257-1	SLEEVING FIBERGLASS .263 ID		52
1		310235-1	REGULATOR PLASTIC 100 PSI		51
1		310183-1	OZONE LAMP HOUSING		50
2		310163-2	CONN PORT SS 1/8T		49
1		310163-1	CONN PORT SS 1/16T		48
1		310161-5	TEE UNION SS 1/8T-1/8T-1/16T		47
2		310161-1	TEE UNION SS 1/16T		46
1		310158-3	ELBOW UNION SS 1/8T-1/16T		45
1		310158-2	ELBOW UNION SS 1/8T 1/8T		44
2		310153-2	TUBE ADAPT MALE SS 1/8T-1/8 NPT		43
4		310143-1	CLAMP CABLE PLASTIC BLACK		42
4		310119-1	BUMPER RUBBER LARGE		41
1		310067-3	TEE BARB KYNAR 1/8 ID TUBING		40
36"		310051-5	TUBING 316 SS 1/16 OD X .040		39
5"		310046-1	TUBING SILICONE 3/32 ID-7/32 OD		38
1		310045-4	ELBOW MALE SS 1/8T-1/8 NPT		37
1		310045-3	ELBOW MALE SS 1/8T-1/16 NPT		36
1		310045-1	ELBOW MALE SS 1/6T-1/16 NPT		35
1		310044-1	TEE MALE BRNCH SS 1/16T-1/16 NPT	NOT SHOWN	34
1		310021-3	LABEL H/S 3/16 X 1 "SAMPLE"		33
1		310021-2	LABEL H/S 3/16 X 1 "AIR"		32
3		310009-1	FAN GUARD WIRE 3.1" SQ		31
1		310002-5	CONN MALE SS 1/8T-1/8 NPT		30
2		300942-3	GROMMET RUBBER 3/8" ID		29
1 FT		300220-11	TUBING FEP BLK .250 OD X .062W		28
7 FT		300220-9	TUBING FEP BLK .125 OD X .031W		27
1		110827-3	ASSY CABLE FAN I/C 600-CLD		26
1		110813-15	ASSY CABLE I/O CPLD 600 NOX/FID		25
1	A	110813-2	ASSY CABLE I/O AUX 600-CLD		24
1	A	110813-1	ASSY CABLE I/O MAIN 600-CLD		23

PART LIST

QTY. REQ'D	REV.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
1		110812-2	ASSY CABLE EPC I/C 600-CLD		22
1	A	110811-2	ASSY CABLE AC PWR PS2 600-CLD		21
1	A	110811-1	ASSY CABLE AC PWR PSI 600-CLD		20
1	D	110762-1	ASSY BOARD RELAY 600-CLD		19
1		110722	SHIP KIT 600-CLD	SEE CHART	18
1	C	110716-1	ASSY PANEL FRONT 600-CLD		17
1	B	110715-1	ASSY PANEL REAR 600-CLD		16
1	B	110714-1	ASSY CABLE DC PWR 600-CLD		15
1		110711-1	ASSY CABLE TCP/IP 600 SERIES		14
1	D	110525-5	ASSY DETECTOR 600-CLD (STAN)		13
1	B	110496-4	ASSY CABLE NOX I/C 600-CLD		12
1	A	110429-2	ASSY CABLE DETECTOR 600-CLD		11
1	A	110419	ASSY CABLE HTR CNVRT 600-CLD	SEE CHART	10
1	A	110417	ASSY CABLE HTR CELL 600-CLD	SEE CHART	9
1		110415-5	ASSY CABLE NOX VALVE 600-CLD		8
2		110395-3	ASSY CABLE FAN 600-CLD		7
1	B	110386-1	ASSY CABLE EPC OZONE CLD		6
1		110378-1	ASSY CONVERTER 400-CLD		5
1	A	110288-3	ASSY CABLE EPC SAMP 400-CLD		4
1	B	110256-2	ASSY CABLE GND CELL 600-CLD		3
1	C	110229-2	ASSY CABLE TEC NOX DET 600-CLD		2
1	D	110213-2	ASSY CABLE MAIN/RELAY 600-CLD		1

PART LIST

REVISIONS

REV.	DESCRIPTION	DRAWN	DATE	APPROVED
B	DELE 110412-1, 110697-1, 110775-1, 300341-1, 310910-1, 310911-1 AND 410291-3, ADD 110827-1, 310158-2, 311069-1, 311075-1, 410307-1, 649307 AND 874800, DELE 110815-1, ADD SHT 9-14	GZG	7-10-03	GD
C	ADD ALL OPTIONS	MD	8-12-07	GD
D	REVISED AND UPDATED	MD	10-3-07	GD

USED ON

APPROVALS	DATE
DRAWN M. DELACRUZ	6-20-07
CHECKED G. DeMINT	6-20-07
ISSUED	

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CAI

ASSY TOP
600-CLD

SIZE B | FSCM NO. | DWG. NO. 110717 | REV. D

SCALE 1/1 | SHEET 1 OF 27

TOP ASSY	VOLTAGE	HTR CELL	HTR CNVRT	LAMP P/S	SHIP KIT	FUSE
110717-1	115V/60 HZ	110417-7	110419-3	410309-1	110722-1	410289-1
110717-2	230V/60 HZ	110417-8	110419-4	410309-2	110722-2	410290-1

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD

HIGH OUTPUT OZONE LAMP OPTION

REPLACE OZONE LAMP 410307-1 WITH
HIGH OUTPUT OZONE LAMP 410307-2

QTY REQ'D	REV.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
2		874800	NUT HEX KEPS YL 8-32		100
20		873800	NUT HEX KEPS YL 6-32		99
4		833400	WASHER LOCK SPLIT #6		98
4		813600	WASHER FLAT NYLON #6		97
8		812600	WASHER FLAT NYLON #4		96
2		661315	SCREW SKHC SS 6-32 X 1"		95
2		661309	SCREW SKHC SS 6-32 X 5/8		94
4		649307	SCREW PH SEMS YL 6-32 X 1/2		93
12		649305	SCREW PH SEMS YL 6-32 X 3/8		92
10		649303	SCREW PH SEMS YL 6-32 X 1/4		91
8		649205	SCREW PH SEMS YL 4-40 X 3/8		90
11		649203	SCREW PH SEMS YL 4-40 X 1/4		89
4		645403	SCREW PH SEMS 8-32 X 1/4		88
4		645313	SCREW PH SEMS 6-32 X 1		87
8		629307	SCREW FH YL 100° 6-32 X 1/2		86
4		629303	SCREW FH YL 100° 6-32 X 1/4		85
1		410792-2	RTD 600-HCLD CONVERTER		84
1		410797-1	RTD 600-HCLD CELL		83
1		410315-8	POWER SUPPLY SWITCH SVDC 6.0A		82
1		410315-3	POWER SUPPLY SWITCH QUAD		81
1		410309	OZONE LAMP P/S HCLD	SEE CHART	80
1		410307-1	OZONE LAMP		79
1		410289-1	FUSE S/B 1/4 X 1/4 4A 250V	SEE CHART	78
10		410283-1	CABLE TIE BLACK SMALL		77
1		410237-6	CONN MOLEX HOUSING .100 8 PIN		76
4		311075-1	CAP VINYL ROUND 9/16		75
1		311069-1	BRACKET MTG FAN 600-CLD		74
1		311006-2	TUBE 600-CLD EPC/REGULATOR		73
1		311000-3	COVER PWR SUPPLY REAR 600-CLD		72
1		311000-2	COVER PWR SUPPLY FRONT 600-CLD		71
1		310997-2	BRACKET POWER SUPPLY 600-CLD		70
2		310996-1	CLAMP OZONE LAMP 600-CLD		69
1		310995-2	BRACKET OZONE LAMP 600-CLD		58
1		310994-1	CASE 600-CLD 22"		67
1		310986-1	INSULATION COVER CONVERTER CLD		66
1		310971-1	COVER CONVERTER 400-CLD		65
1		310899-1	INSULATOR CELL CLD		64
1		310893-2	MANIFOLD 600-CLD SAMPLE		63
1		310890-1	PLATE MOUNTING BENCH 400-CLD		62
1		310824-1	BRACKET CONVERTER CLD		61
1		310823-2	INSULATOR CONVERTER HCLD BACK		60
1		310823-1	INSULATOR CONVERTER HCLD FRONT		59
1		310762-4	CAPILLARY CLD BP EPC		58
1		310763-3	CAPILLARY CLD BP CONVERTER		57
1		310762-2	CAPILLARY CLD BP SAMPLE (30)		56
QTY REQ'D	REV.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.

PART LIST

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USED ON

APPROVALS	DATE
DRAWN M. DELACRUZ	6-20-07
CHECKED G. DeMINT	6-20-07
ISSUED	

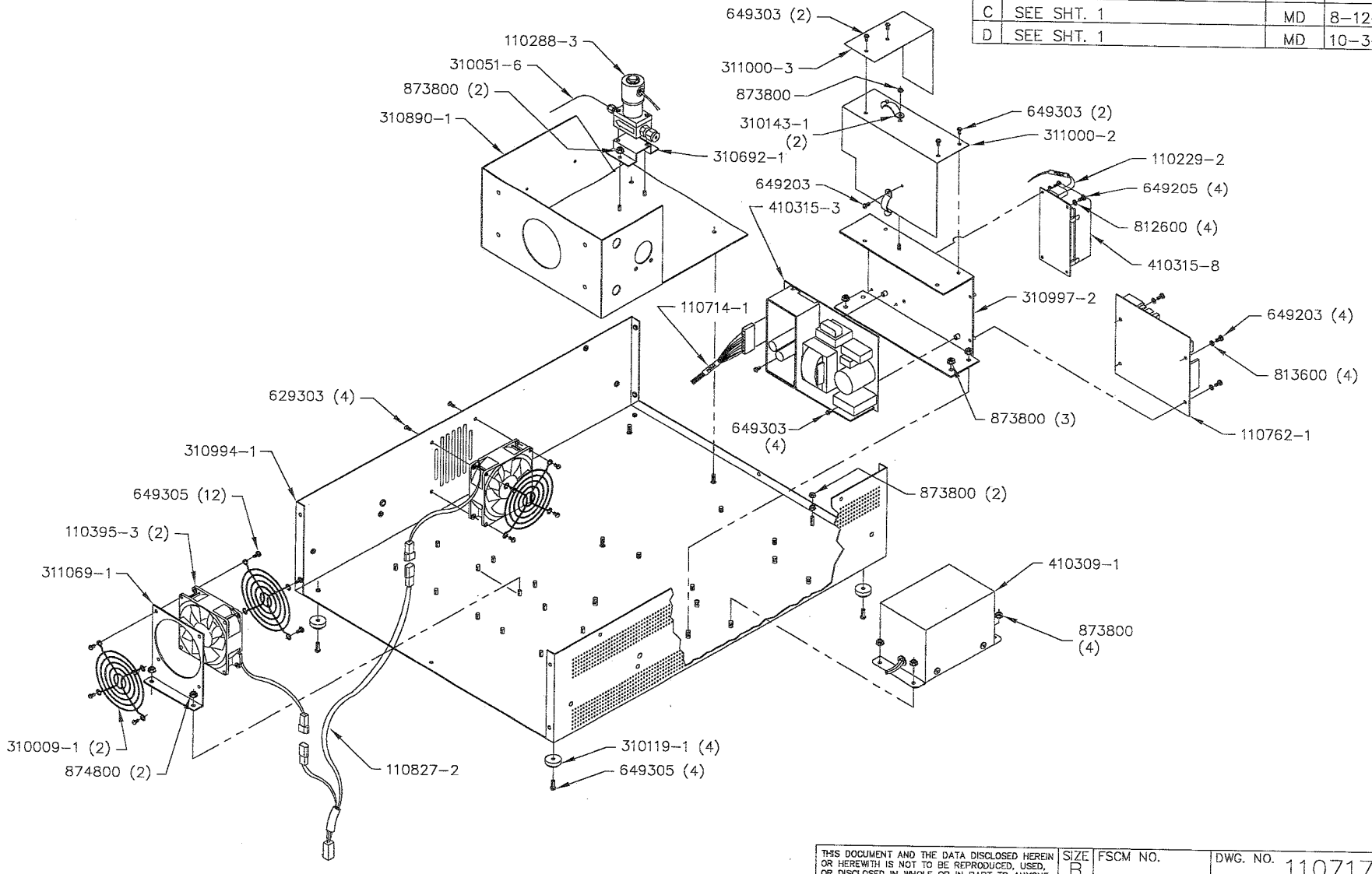
CAI

ASSY TOP
600-CLD

SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D

SCALE 1/1 SHEET 2 OF 27

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD



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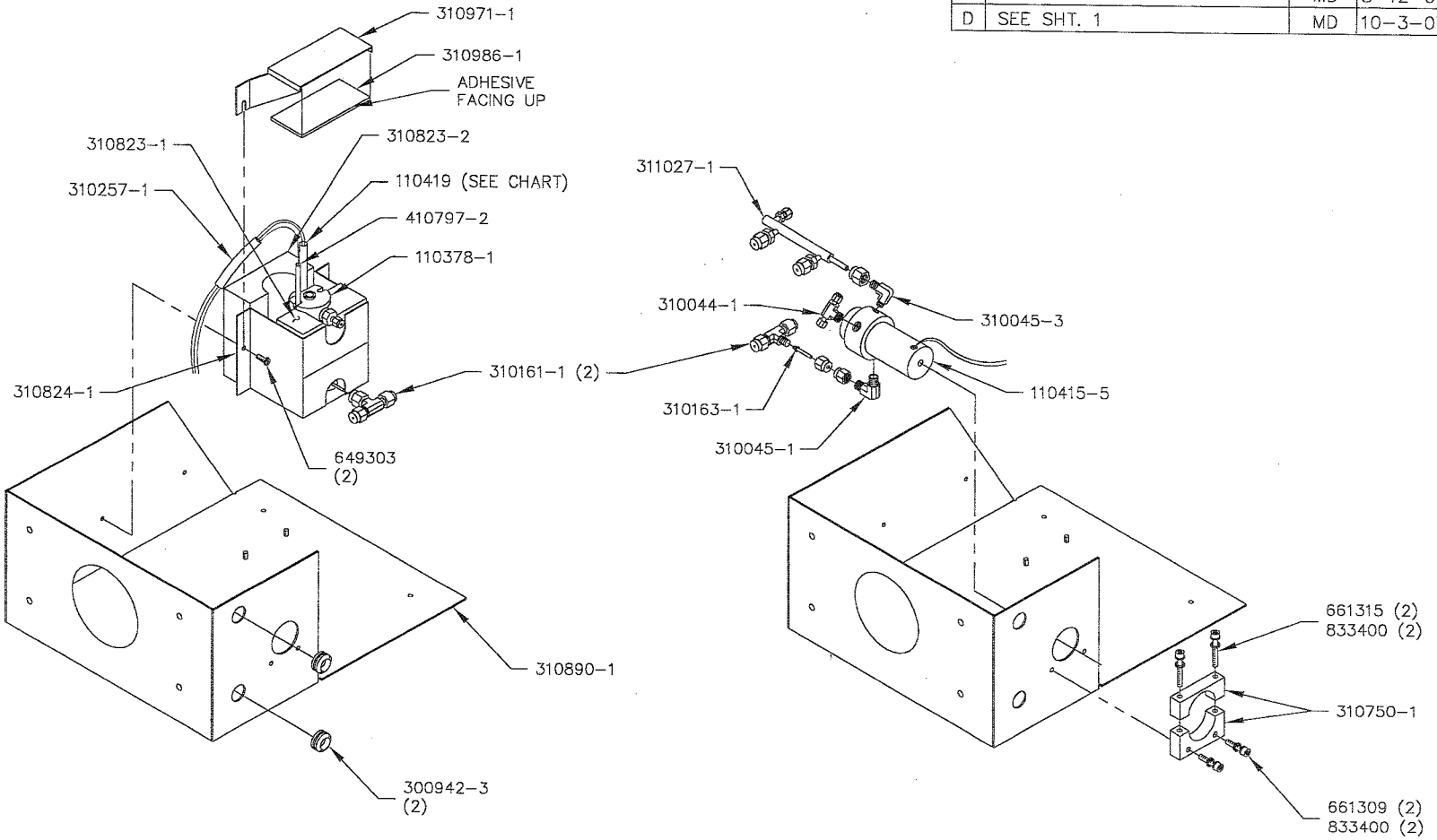
SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE 3/16		SHEET 3 OF 27	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD



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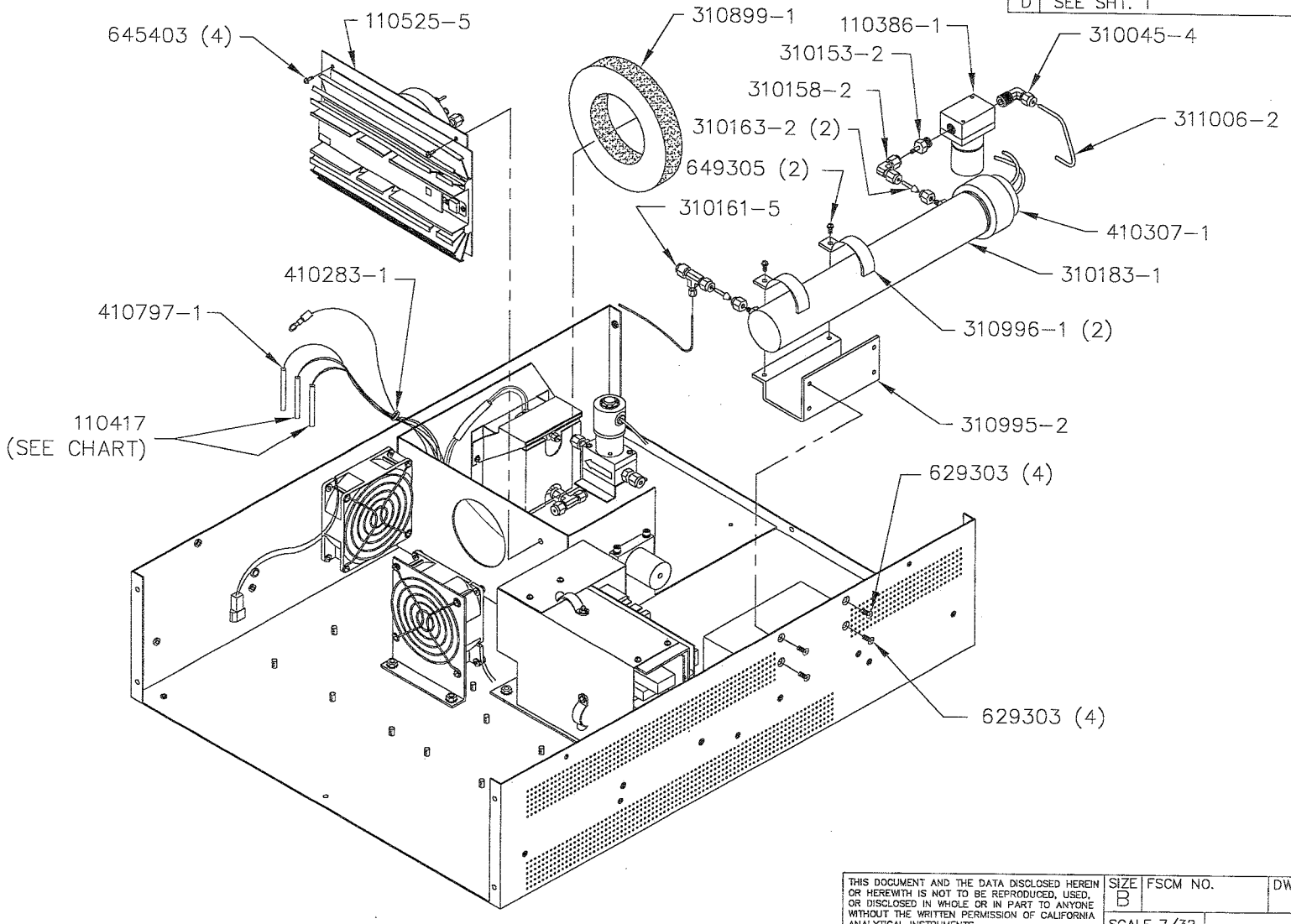
SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE		SHEET 4 OF 27	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD



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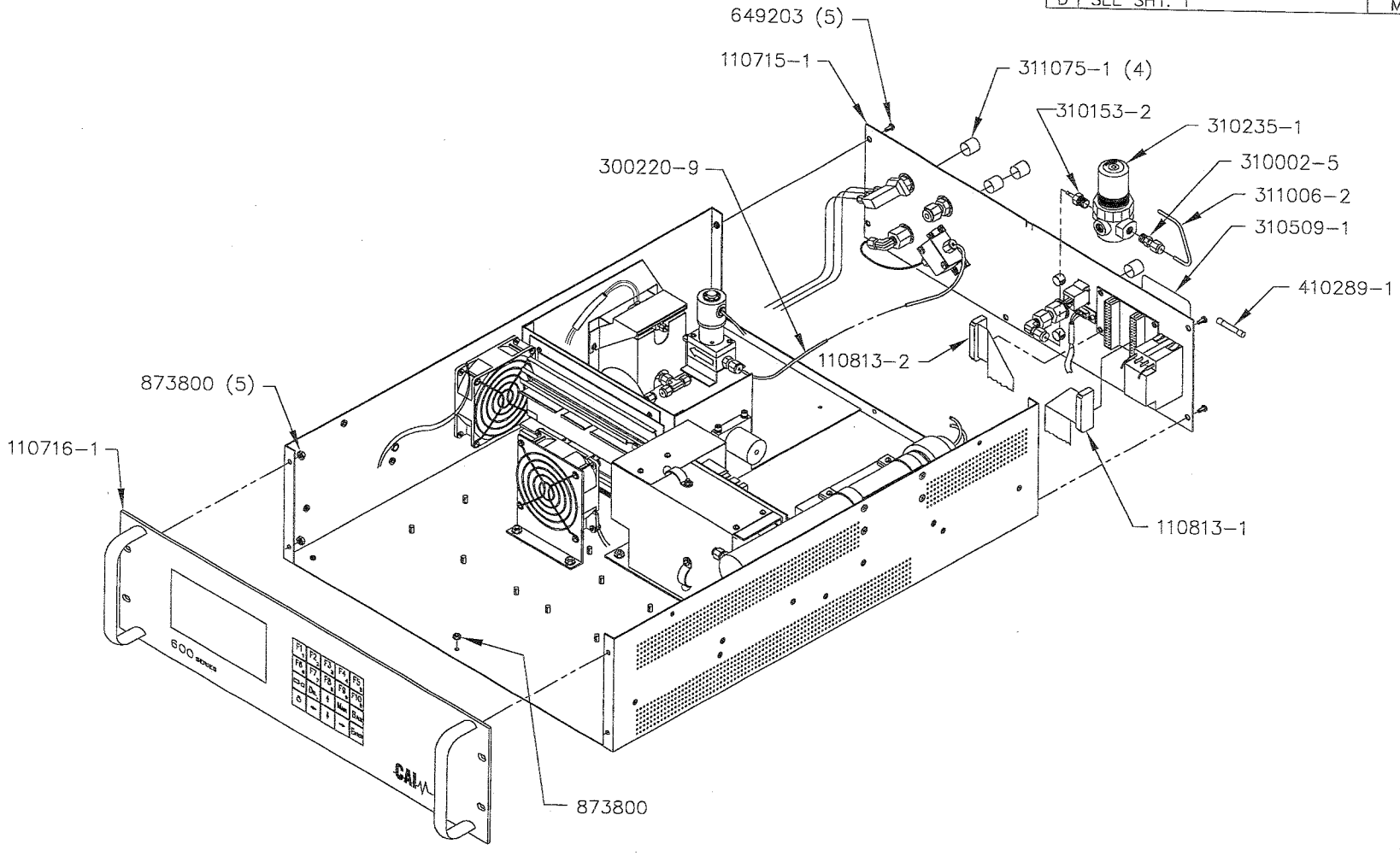
SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE 7/32		SHEET 5 OF 27	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD



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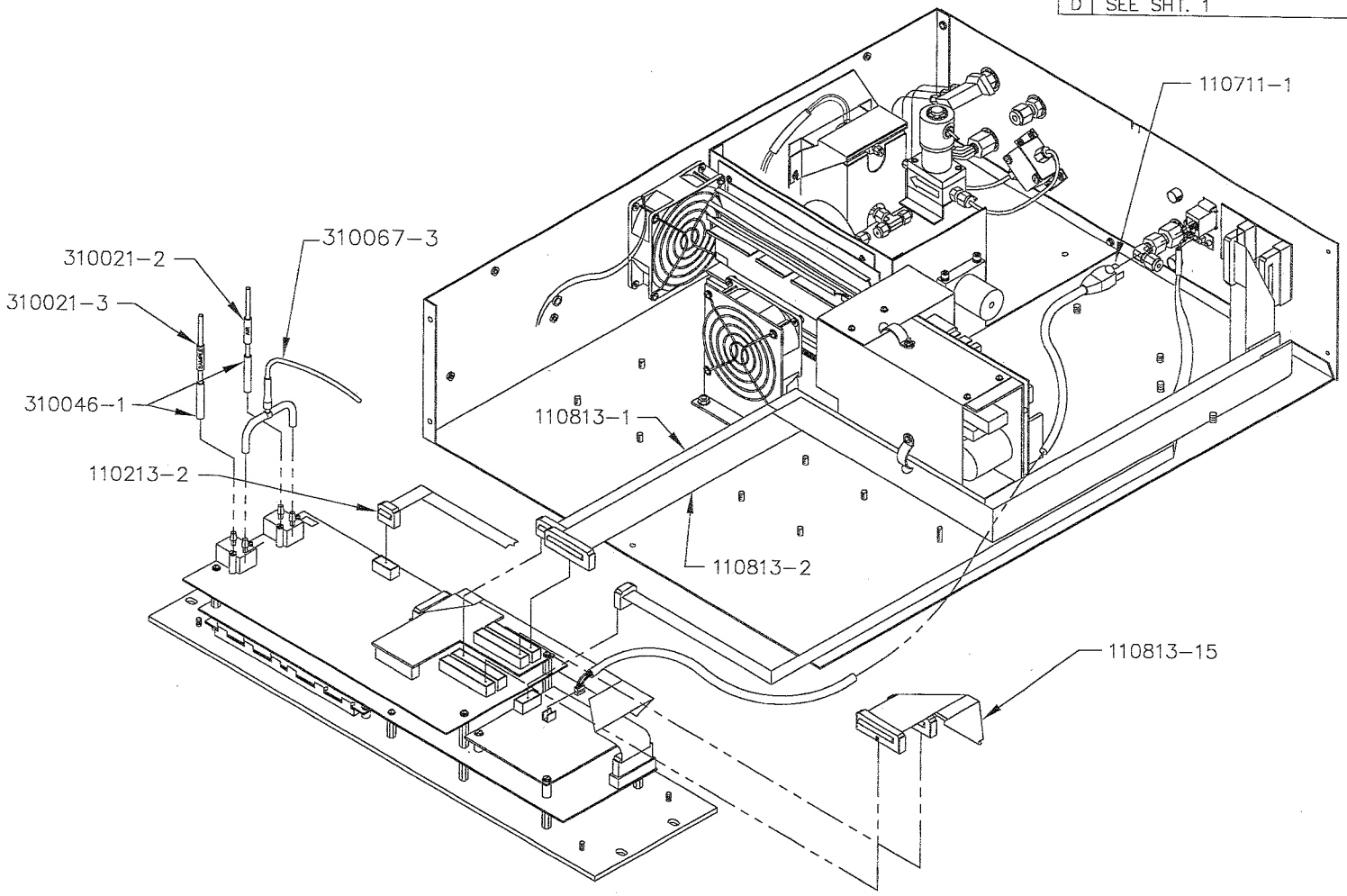
SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE 7/32		SHEET 6 OF 27	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD



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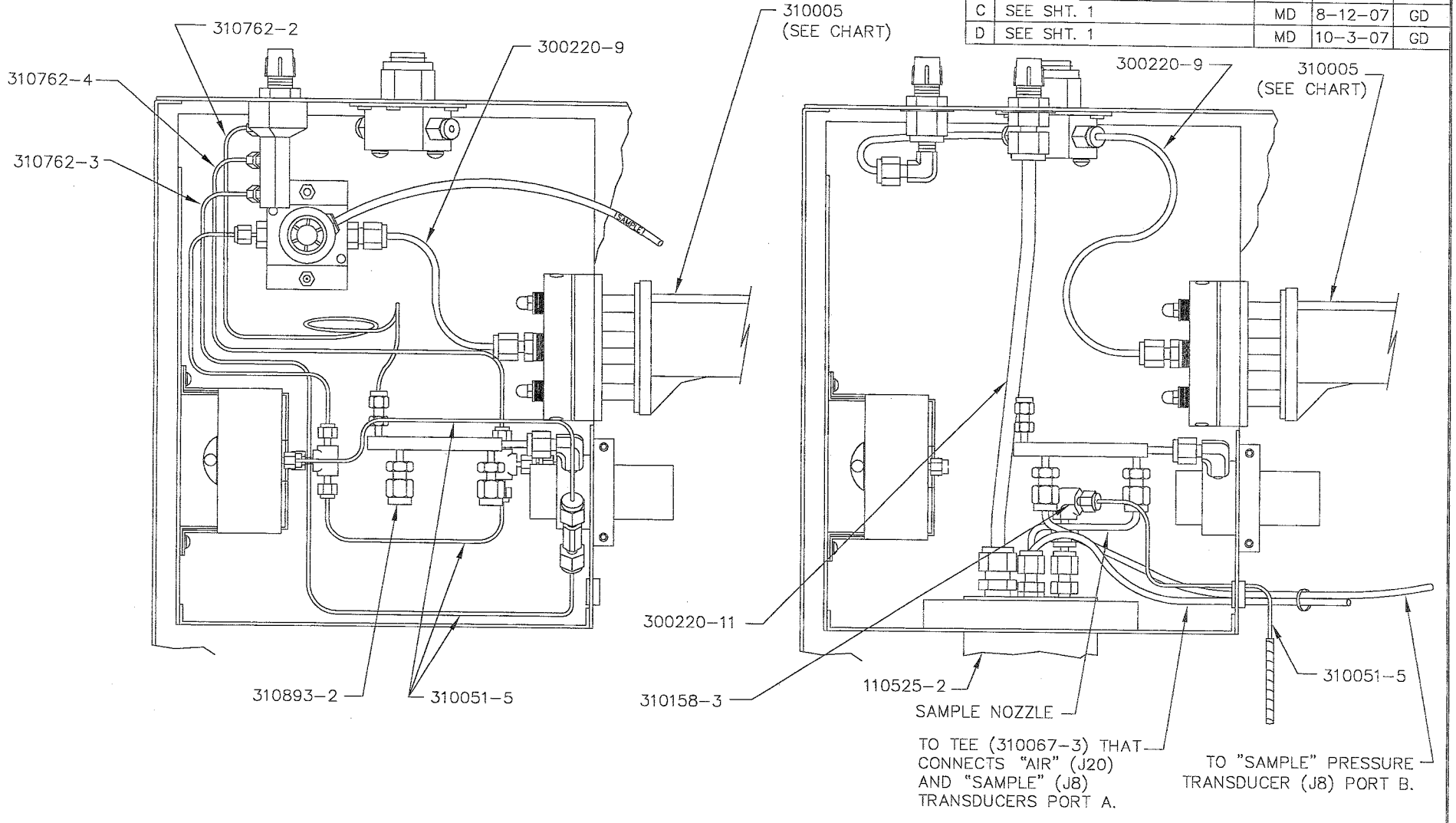
SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE 1/4		SHEET 8 OF 27	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD



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SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE –		SHEET 11 OF 27	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
B	110487-3 AND 110487-4 WAS 110487-1 AND 110487-2, REV/REDWN	GZG	9-24-03	GD

QTY REQD		PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
6		840800	WASHER LOCK INT TOOTH 7/16 YL		23
2		649503	SCREW PH SEMS YL 10-32 X 1/4		22
4		649303	SCREW PH SEMS YL 6-32 X 1/4		21
4		649203	SCREW PH SEMS YL 4-40 X 1/4		20
1		410753-1	CONN AMP MOD COUPLER 8 PIN		19
1		311006-1	TUBE 600-CLD SOLENOID VALVES		18
2		310998-1	SCREWLOCK FEMALE 4-40 X .250		17
1		310987-1	PANEL REAR 600-CLD		16
1		310893-1	MANIFOLD BYPASS HCLD		15
1		310837-1	BRACKET FILTER TEE		14
1		110335-1	FILTER "T" 7 MICRON 1/8T		13
3		310227-1	FILTER IN-LINE SCREEN 10 UM		12
1		310176-2	BULKHEAD UNION SS 1/4T-1/4T		11
2		310151-1	BULKHEAD FEM SS 1/4T-1/8 NPT		10
2		310150-1	BULKHEAD MALE SS 1/4-1/8 NPT		9
3		310045-4	ELBOW MALE SS 1/8T-1/8 NPT		8
1		310044-2	TEE MALE BRNCH SS 1/8T-1/8 NPT		7
4"		300220-9	TUBING FEP BLK .125 X .031 W		6
1	A	110792-5	ASSY CABLE PWR ENT 600-CLD		5
1	A	110748-2	ASSY CABLE TERM BLOCK DUAL		4
1	B	110712-1	ASSY CABLE SERIAL 600 SERIES		3
1		110487-4	ASSY CABLE S/V 600-CLD SPAN		2
1		110487-3	ASSY CABLE S/V 600-CLD ZERO		1

PART LIST

USED ON

CAI

APPROVALS	DATE
DRAWN G. GRISETA	4-24-02
CHECKED G. DEMINT	4-24-02
ISSUED G. GRISETA	4-24-02

ASSY PANEL, REAR 600-CLD (MODE)

SIZE	FSCM NO.	DWG. NO.	REV.
B		110715-2	B

SCALE -

SHEET 1 OF 2

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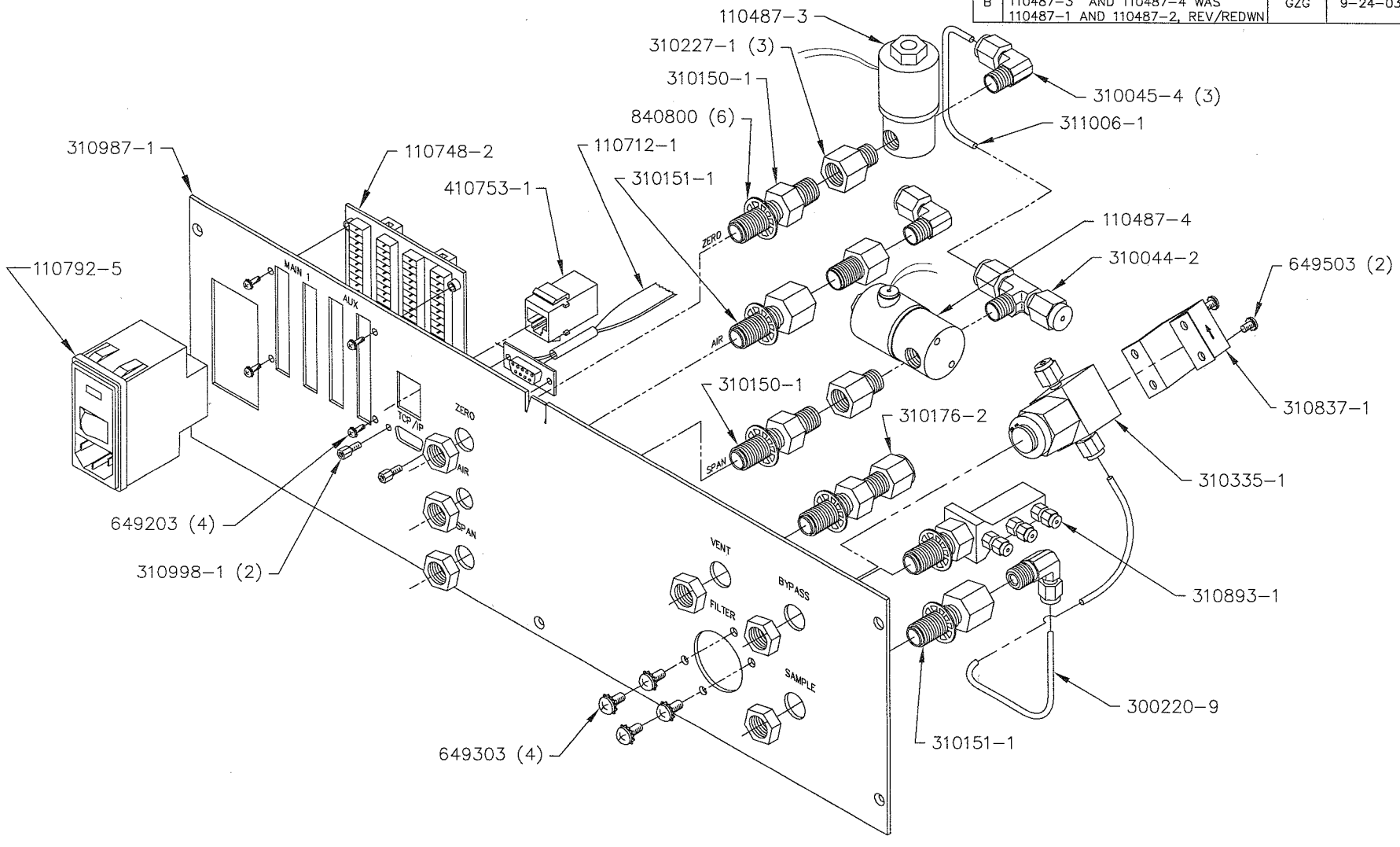
REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
B	110487-3 AND 110487-4 WAS 110487-1 AND 110487-2, REV/REDWN	GZG	9-24-03	GD



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	SCALE 1/2		SHEET 2 OF 2	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED

QTY REQD		PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
4		840800	WASHER LOCK INT TOOTH 7/16 YL		21
2		649503	SCREW PH SEMS YL 10-32 X 1/4		20
4		649303	SCREW PH SEMS YL 6-32 X 1/4		19
4		649203	SCREW PH SEMS YL 4-40 X 1/4		18
1		410753-1	CONN AMP MOD COUPLER 8 PIN		17
1		311006-20	TUBE 600-CLD T-FILTER/TEE		16
2		310998-1	SCREWLOCK FEMALE 4-40 X .250		15
1		310897-1	PANEL REAR 600-CLD		14
1		310893-4	MANIFOLD CLD ATMOSPHERIC BP		13
1		310837-1	BRACKET FILTER TEE		12
1		310335-1	FILTER "T" 7 MICRON 1/8T		11
1		310227-1	FILTER IN-LINE SCREEN 10 UM		10
1		310176-2	BULKHEAD UNION SS 1/4T-1/4T		9
1		310161-2	TEE UNION SS 1/8 T		8
2		310151-1	BULKHEAD FEM SS 1/4T-1/8 NPT		7
2		310045-4	ELBOW MALE SS 1/8T-1/8 NPT		6
2		300979-1	PLUG HOLE 7/16" BLACK		5
4"		300220-9	TUBING FEP BLK .125 OD X .031 W		4
1	A	110792-5	ASSY CABLE PWR ENT 600-CLD		3
1	A	110748-2	ASSY BOARD TERM BLOCK DUAL		2
1	B	110712-1	ASSY CABLE SERIAL 600 SERIES		1

PART LIST

USED ON

APPROVALS	DATE
DRAWN M. DELACRUZ	6-15-07
CHECKED G. DeMINT	6-15-07
ISSUED	

CAI

ASSY PANEL REAR
600-CLD (ATOM)

SIZE B | FSCM NO. | DWG. NO. 110715-26 | REV.

SCALE - | SHEET 1 OF 2

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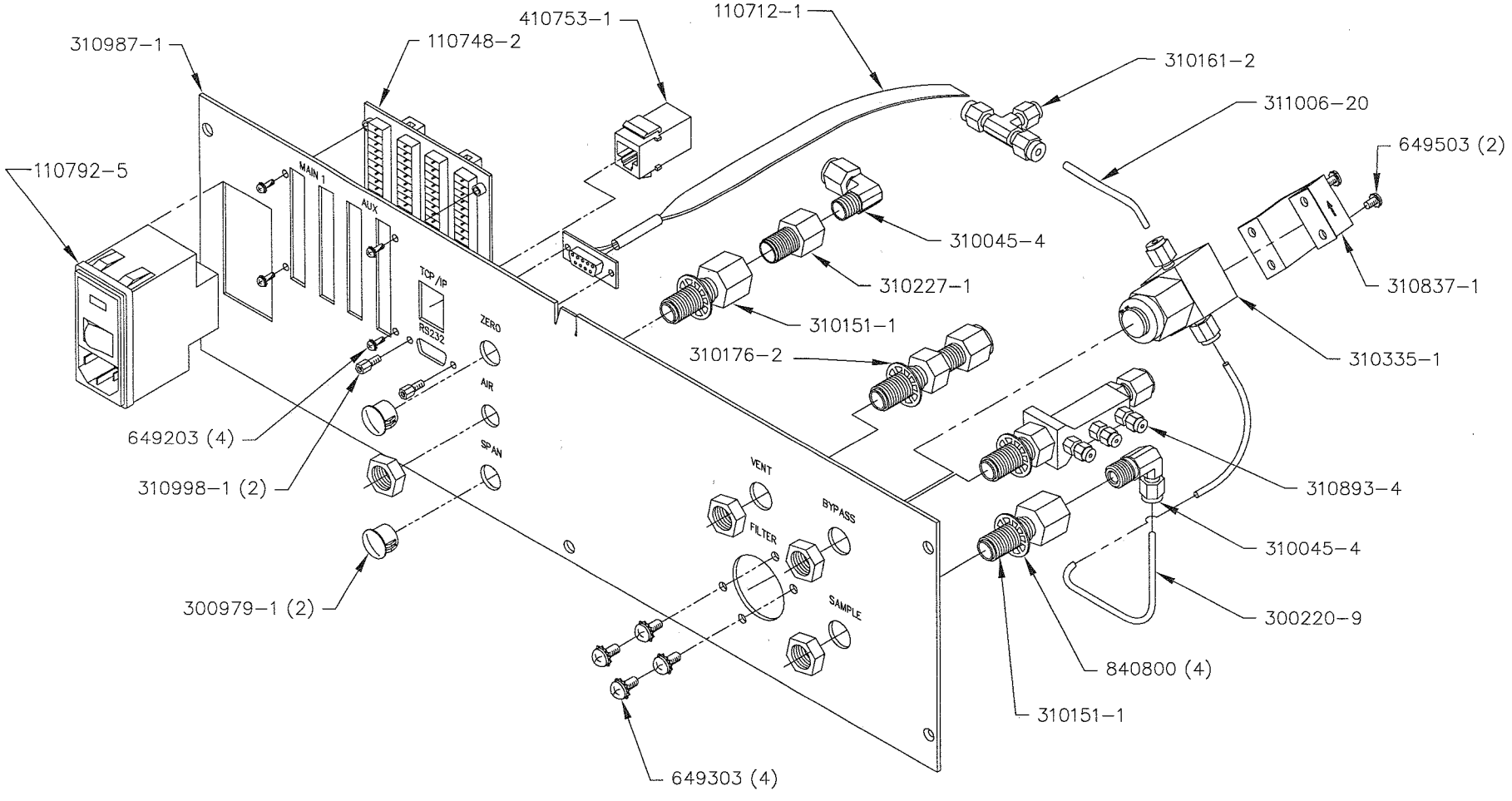
REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED



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SIZE	FSCM NO.	DWG. NO.	REV.
B		110715-26	
SCALE 1/2		SHEET 2 OF 2	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD

TOP ASSY	VOLTAGE	PUMP HI-TEMP
110717-1	115V/60HZ	310005-5
110717-2	230V/50HZ	310005-6

QTY. REQ'D	REV.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
4		874800	NUT HEX KEPS YL 8-32		13
2		734400	WASHER LOCK SPLIT M4		12
1		645505	SCREW PH SEMS 10-32 X 3/8		11
2		535405	SCREW PH M4 X 10MM		10
1		310999-1	BRACKET MTG PUMP HI-TEMP 600		9
4		310292-1	MOUNT VIBRATION RUBR M/F 8-32		8
1		310197-3	LABEL WARNING INLET PRESSURE		7
1		310119-4	BUMPER RUBBER HI-TEMP PUMP		6
1		310005	PUMP HI-TEMP (H/D)	SEE CHART	5
2		310002-5	CONN MALE SS 1/8T-1/8 NPT		4
1 FT		300220-9	TUBING FEP BLK .125 OD X .031 W		3
1	A	110413-2	ASSY CABLE GND PUMP 600-CLD		2
1	B	110397-2	ASSY CABLE PUMP 600-CLD		1

PART LIST

USED ON

CAI

APPROVALS	DATE
DRAWN G. GRISETA	10-28-03
CHECKED G. DEMINT	10-28-03
ISSUED	

OPTION PUMP STANDARD
600-CLD

SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D

SCALE 1/1 SHEET 9 OF 27

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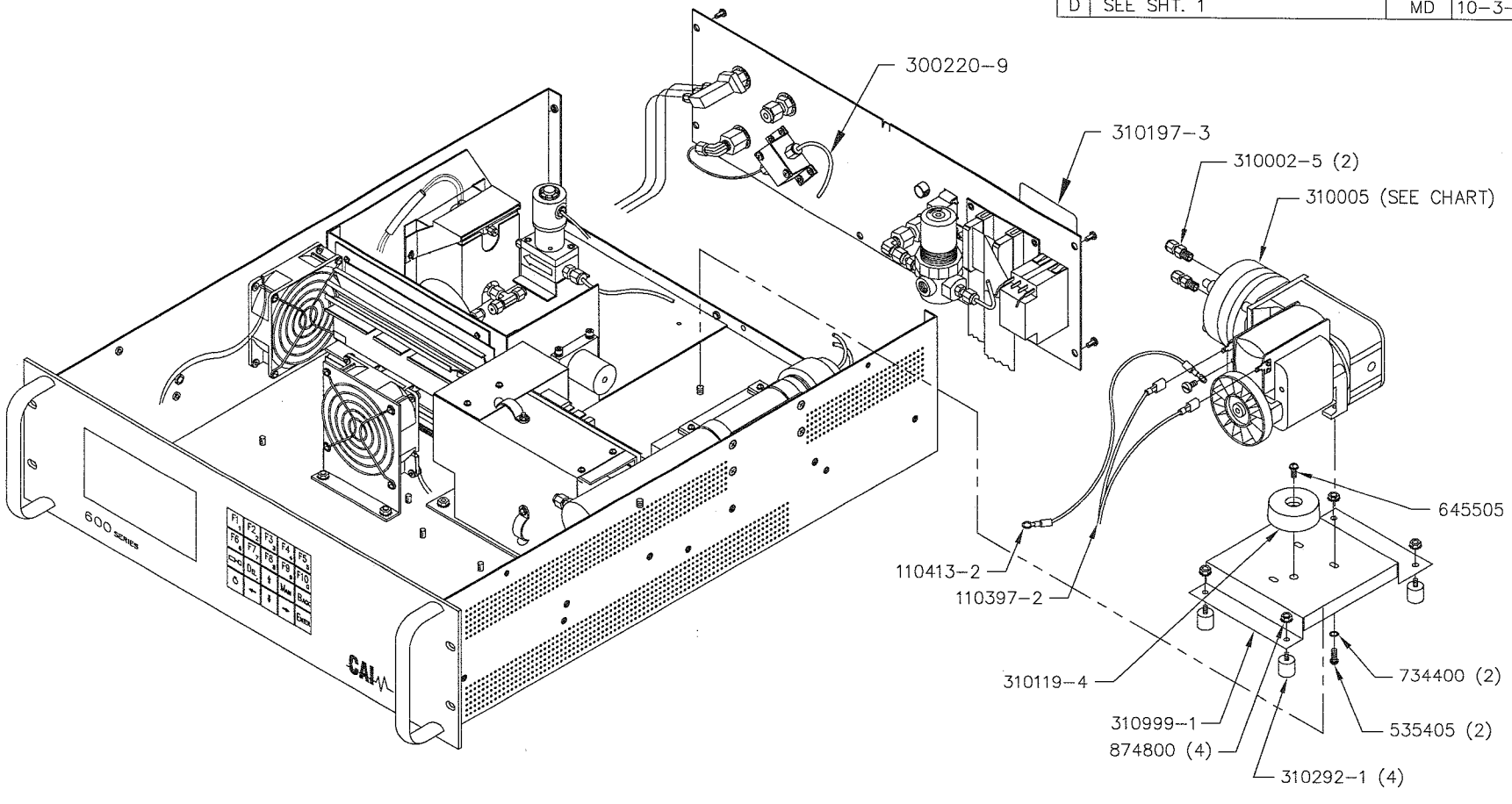
REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD



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SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE 7/32		SHEET 10 OF 27	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD

TOP ASSY	VOLTAGE	PUMP HI-TEMP
110717-1	115V/60HZ	110157-13
110717-2	230V/50HZ	110157-14

QTY. REQ'D	REV.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
4		874800	NUT HEX KEPS YL 8-32		14
4		649403	SCREW PH SEMS YL 8-32 X 1/4		13
1-		310762-4	CAPILLARY CLD BP EPC		12
1		310438-2	PLATE MTG BYPASS PUMP 600-CLD		11
4		310292-1	MOUNT VIBRATION RUBR M/F 8-32		10
1-		310161-1	TEE UNION SS 1/16T		9
1		310158-1	ELBOW UNION SS 1/16T-1/16T		8
1		310128-1	CAP SS 1/16T		7
4"		310046-1	TUBING SILICONE 3/32ID-7/32OD		6
24"		300220-9	TUBING FEP BLK .125 OD X .031W		5
1		110840-1	ASSY CABLE GND SENSOR 02-650 NOX		4
1		110715-26	ASSY PANEL REAR 600-CLD (ATOM)		3
1-	B	110715-1	ASSY PANEL REAR 600-CLD		2
1		110157	ASSY CABLE PUMP ATMOSPHERIC BP 115V	SEE CHART	1

PART LIST

USED ON

APPROVALS	DATE
DRAWN M. DELACRUZ	6-22-07
CHECKED G. DeMINT	6-22-07
ISSUED	

CAI

OPTION PUMP ATMOSPHERIC BYPASS 600-CLD

SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D

SCALE 1/1 SHEET 12 OF 27

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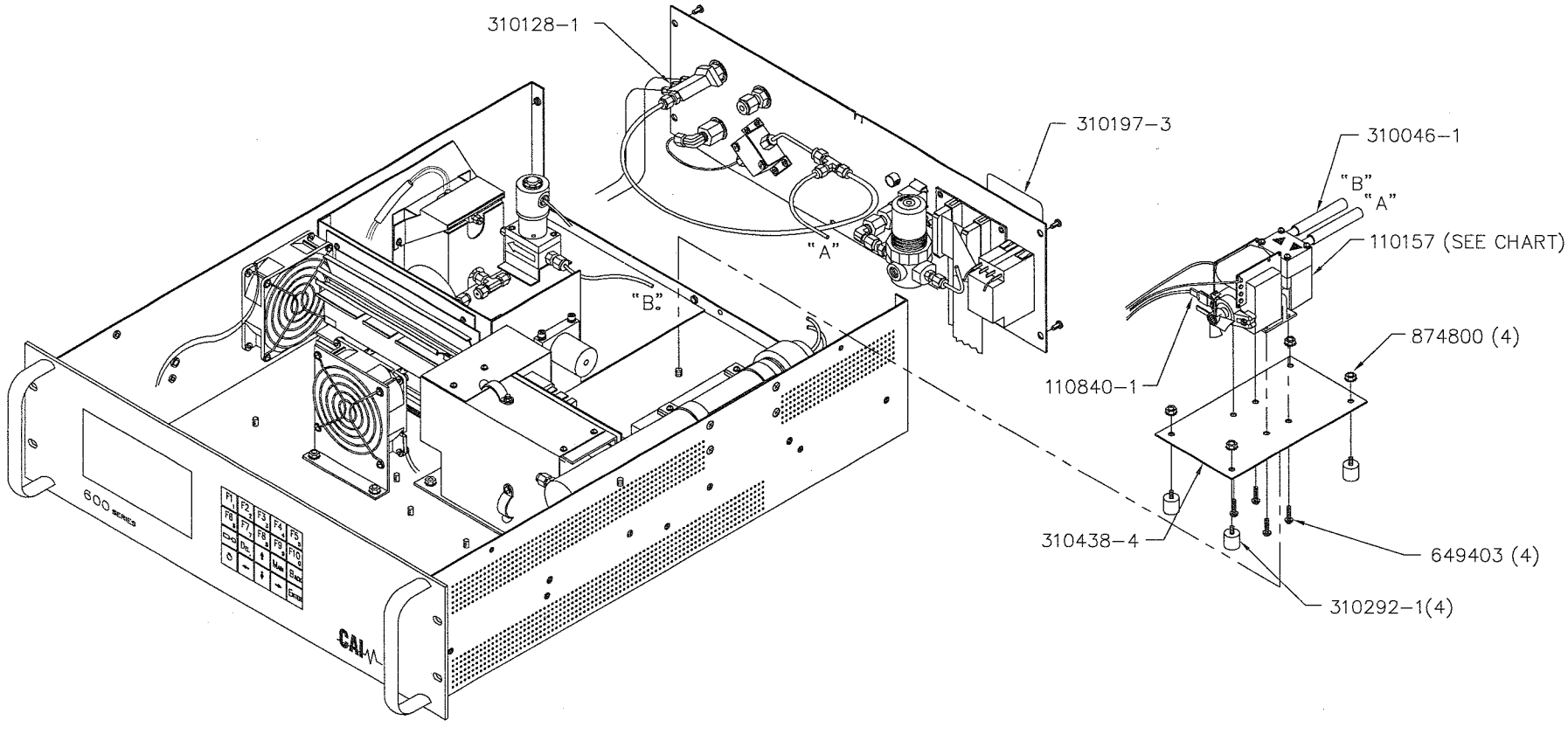
REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD



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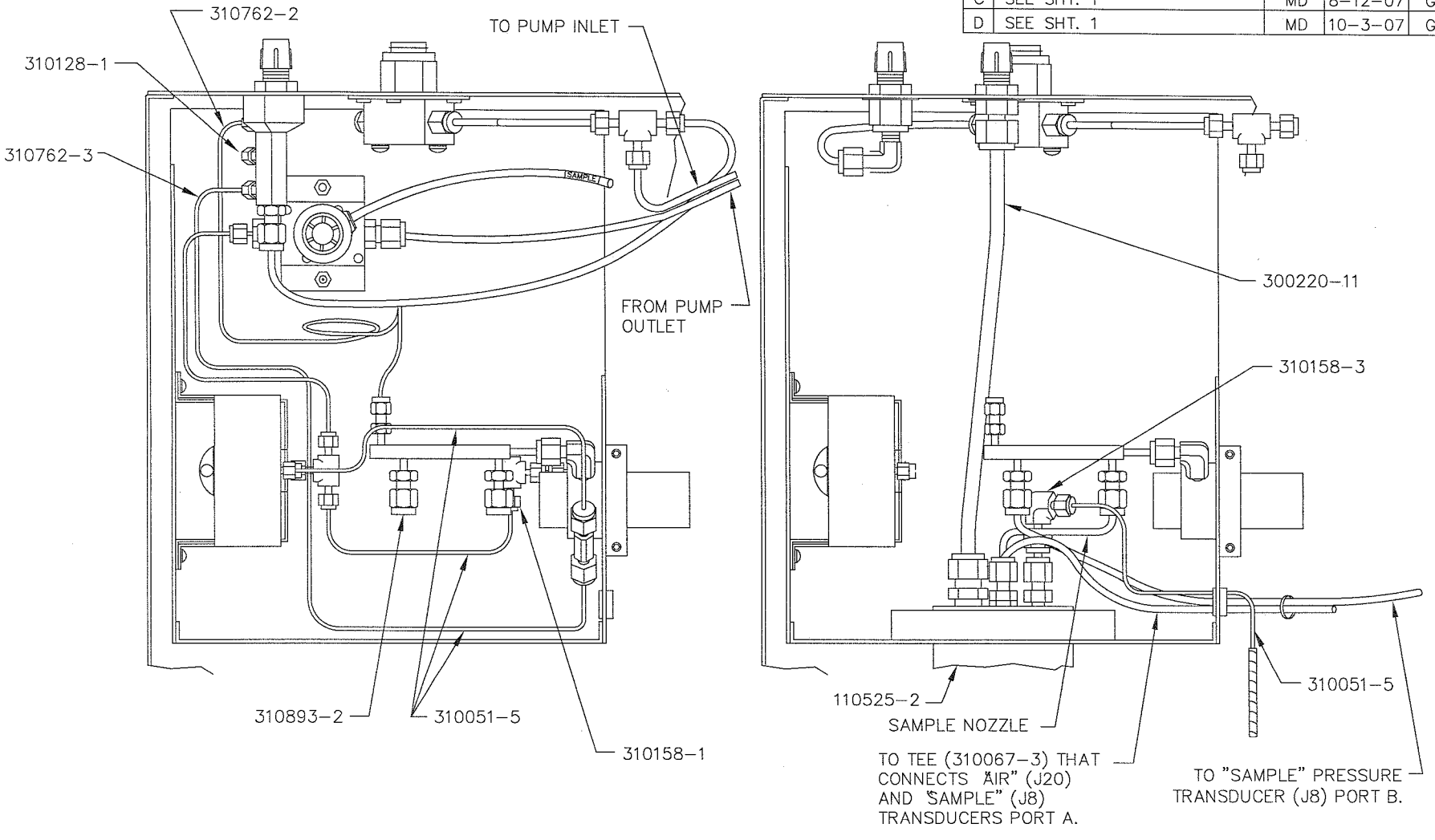
SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE 7/32		SHEET 13 OF 27	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD



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SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE –		SHEET 14 OF 27	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD

QTY. REQ'D	REV.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
3		310163-2	CONN PORT SS 1/8T		6
1		310161-2	TEE UNION SS 1/8T		5
2		310084-3	VALVE CHECK SS 1/8T 1/3 PSI VI		4
1 FT		300220-9	TUBING FEP BLK .125 OD X .031 W		3
1	B	110715-2	ASSY PANEL REAR 600-CLD (MODE)		2
1-	B	110715-1	ASSY PANEL REAR 600-CLD		1

PART LIST

USED ON

APPROVALS	DATE
DRAWN M. DELACRUZ	7-9-07
CHECKED G. DeMINT	7-9-07
ISSUED	

CAI

OPTION ZERO/SPAN SOLENOIDS 600-CLD

SIZE B | FSCM NO. | DWG. NO. 110717 | REV. D

SCALE 1/1 | SHEET 15 OF 27

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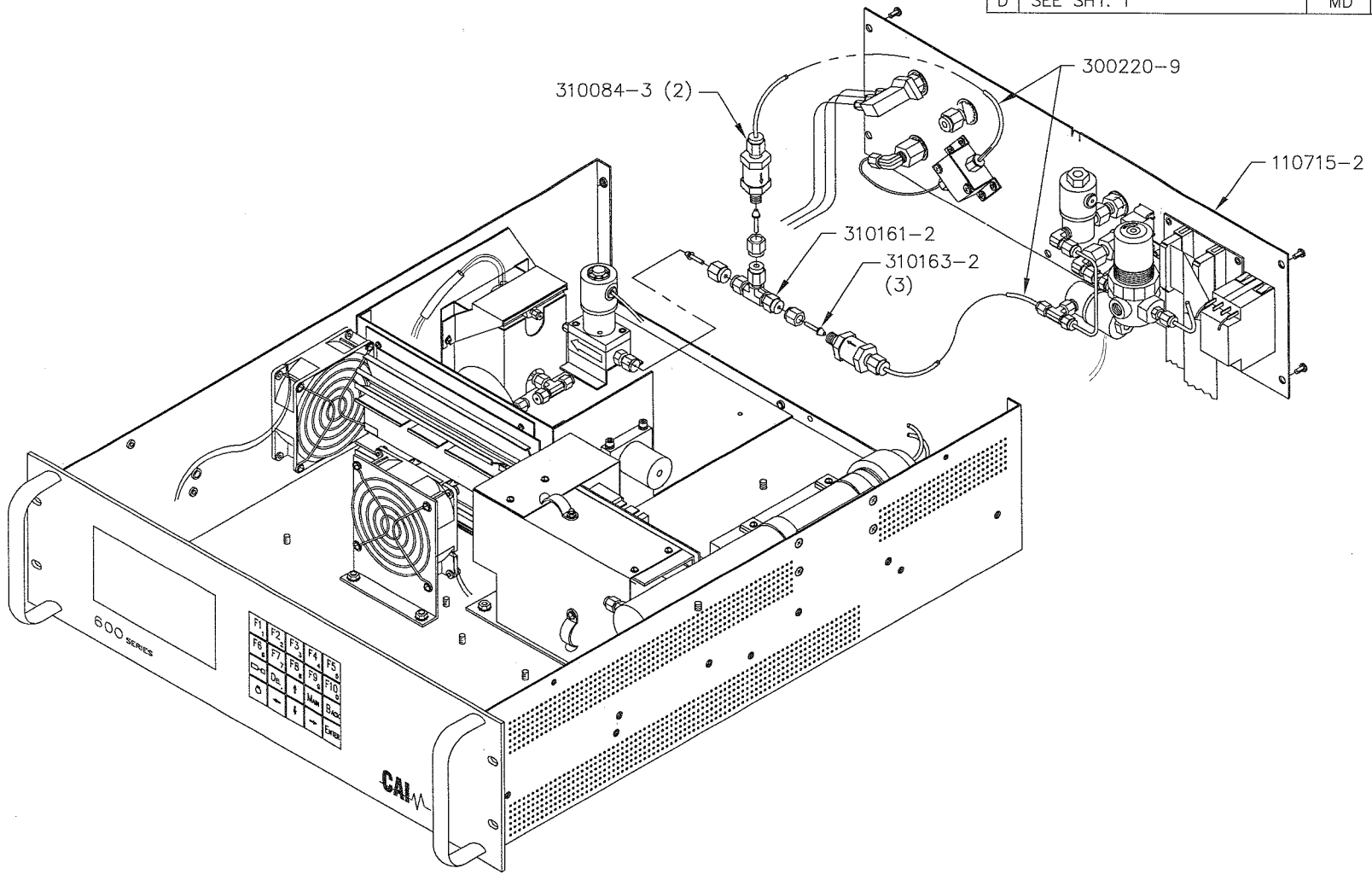
REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD



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SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE 1/4		SHEET 16 OF 27	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD

QTY. REQ'D	REV.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
3		310163-2	CONN PORT SS 1/8T		6
1		310161-2	TEE UNION SS 1/8T		5
1		310084-3	VALVE CHECK SS 1/8T 1/3 PSI VI		4
1 FT		300220-9	TUBING FEP BLK .125 X .031 W		3
1	B	110715-2	ASSY PANEL REAR 600-CLD (MODE)		2
1-	B	110715-1	ASSY PANEL REAR 600-CLD		1

PART LIST

USED ON

APPROVALS	DATE
DRAWN M. DELACRUZ	7-10-07
CHECKED G. DeMINT	7-10-07
ISSUED	

CAI

OPTION ZERO/SPAN SOLENOIDS (PUMP) 600-CLD

SIZE B | FSCM NO. | DWG. NO. 110717 | REV. D

SCALE - | SHEET 17 OF 27

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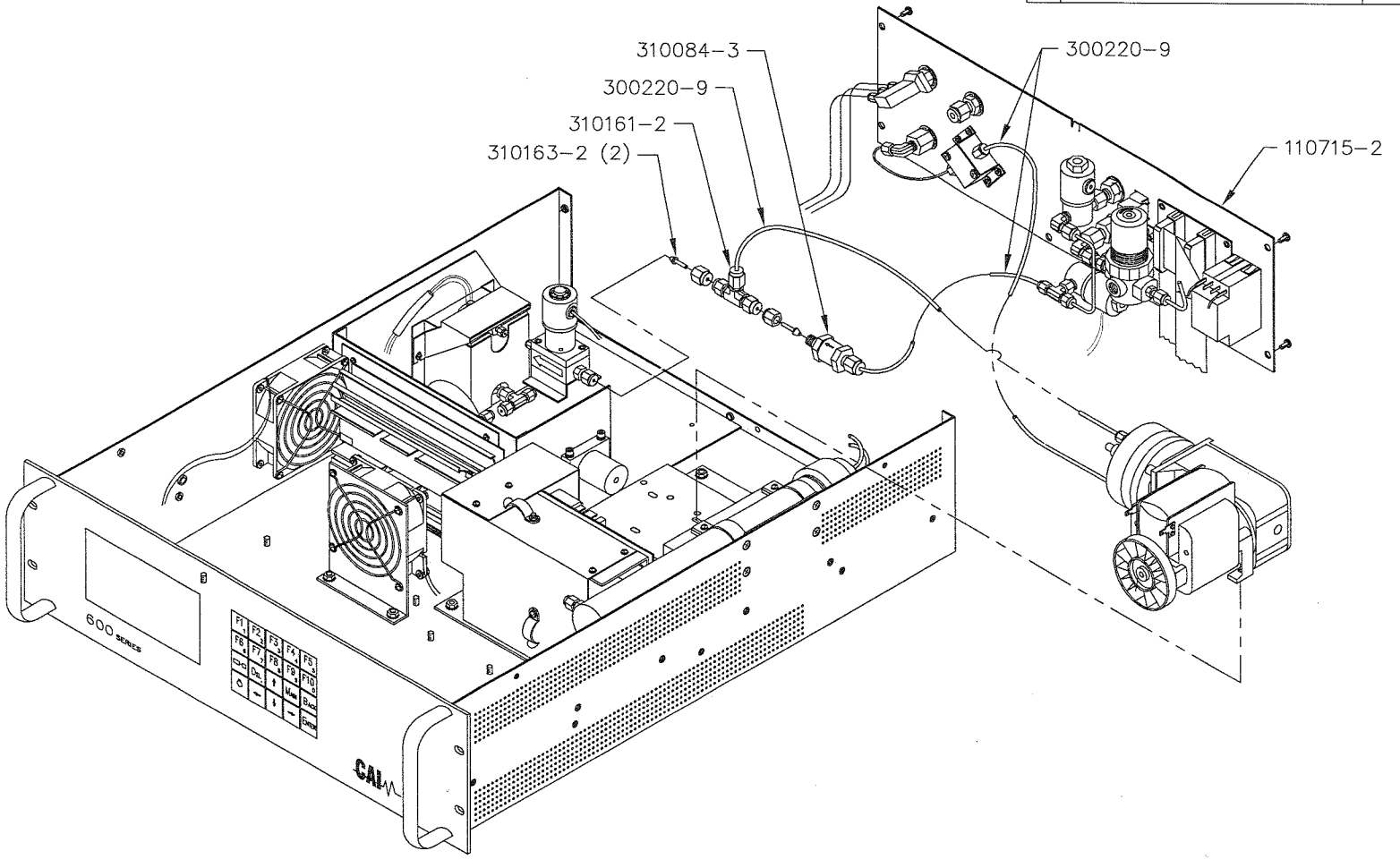
REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD



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SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D

SCALE 1/4

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD

QTY. REQ'D	REV.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
1-		310762-4	CAPILLARY CLD BP EPC		4
1-		310161-1	TEE UNION SS 1/6T		3
1		310158-1	ELBOW UNION SS 1/16T-1/16T		2
1		310128-1	CAP SS 1/16T		1

PART LIST

USED ON

APPROVALS	DATE
DRAWN M. DELACRUZ	7-10-07
CHECKED G. DeMINT	7-10-07
ISSUED	

CAI

OPTION LOW FLOW
600-CLD

SIZE B | FSCM NO. | DWG. NO. 110717 | REV. D

SCALE - | SHEET 19 OF 27

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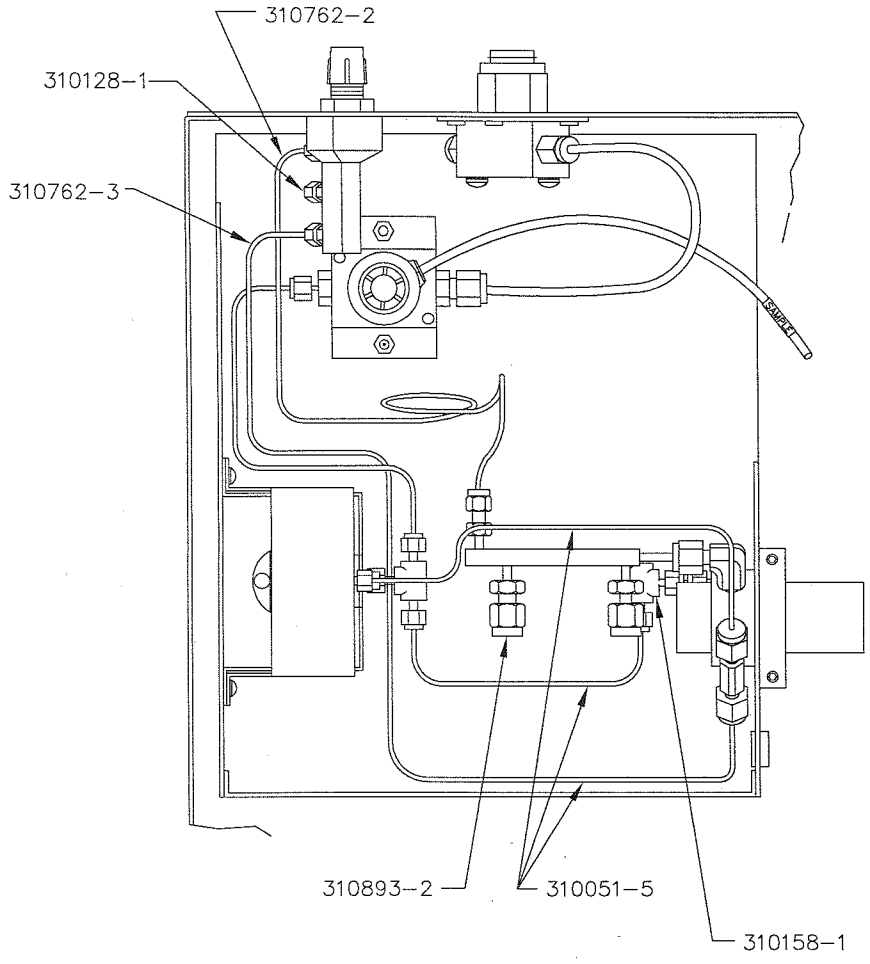
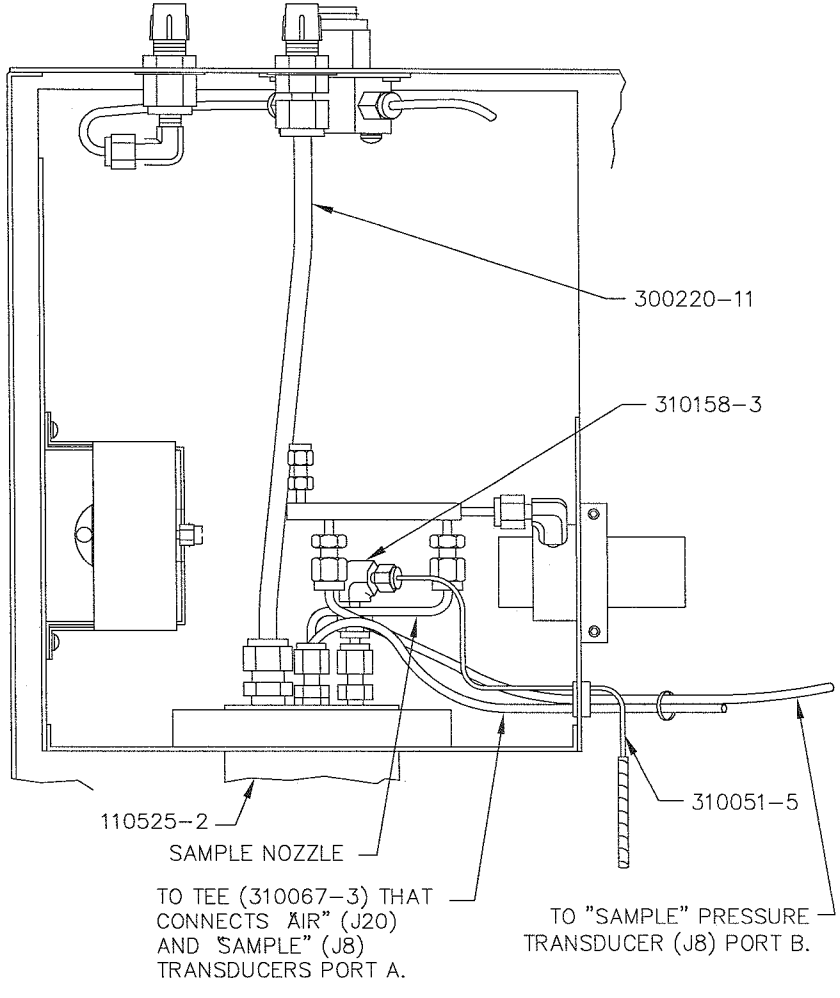
REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD





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SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE –		SHEET 20 OF 27	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD

QTY. REQ'D	REV.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
1-		310762-4	CAPILLARY CLD BP EPC		
1-		310762-3	CAPILLARY CLD BP CONVERTER		
1-		310762-2	CAPILLARY CLD BP SAMPLE (30)		4
3		310092-1	UNION TUBE SS 1/16T		3
1		110525-7	ASSY DETECTOR 600-CLD (LO)		2
1-		110525-5	ASSY DETECTOR 600-CLD (STAN)		1

PART LIST

USED ON

APPROVALS	DATE
DRAWN M. DELACRUZ	7-10-07
CHECKED G. DeMINT	7-10-07
ISSUED	

CAI

OPTION LOW FLOW AND LOW PRESSURE 600-CLD

SIZE B | FSCM NO. | DWG. NO. 110717 | REV. D

SCALE - | SHEET 21 OF 27

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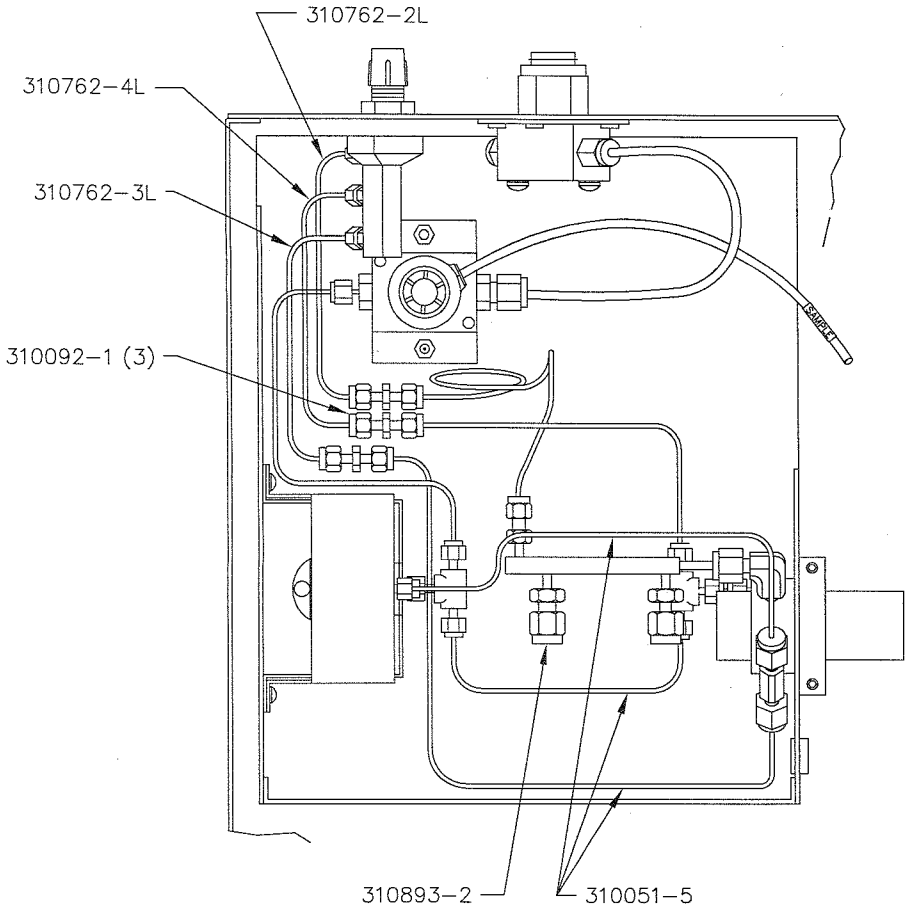
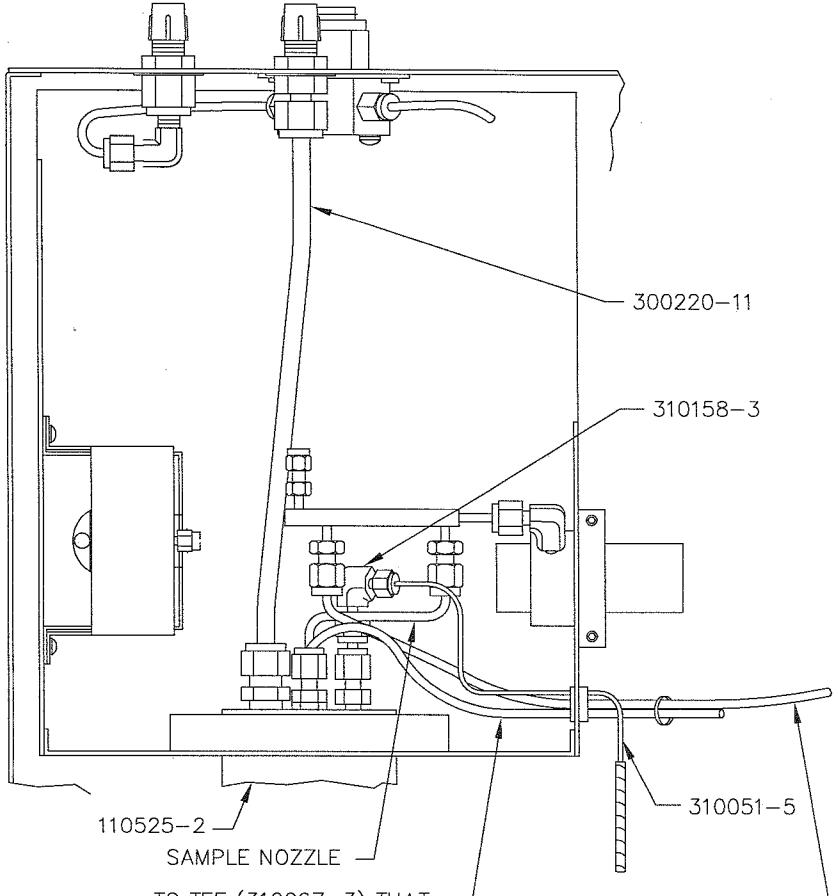
REVISIONS				
REV.	DESCRIPTION	DRAWN.	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD





NOTE 1: REPLACE 5 PSI PRESSURE SENSOR (410196-1) ON MAIN BOARD (J8 SAMPLE) WITH 1 PSI PRESSRE SENSOR (410196-3).

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SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE –		SHEET 22 OF 27	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD

QTY. REQ'D	REV.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
2		310161-7	TEE UNION SS 1/8T-1/8NPT		6
1-		310161-1	TEE UNION SS 1/16T		5
1		310158-1	ELBOW UNION SS 1/16T-1/16T		4
2		310153-2	TUBE ADAPT MALE SS 1/8T-1/8NPT		3
1		310128-1	CAP SS 1/16T		2
2-		310002-5	CONN MALE SS 1/8T-1/8T-1/8NPT		1

PART LIST

USED ON

APPROVALS	DATE
DRAWN M. DELACRUZ	7-10-07
CHECKED G. DeMINT	7-10-07
ISSUED	

CAI

OPTION LOW FLOW (PUMP)
600-CLD

SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D

SCALE -

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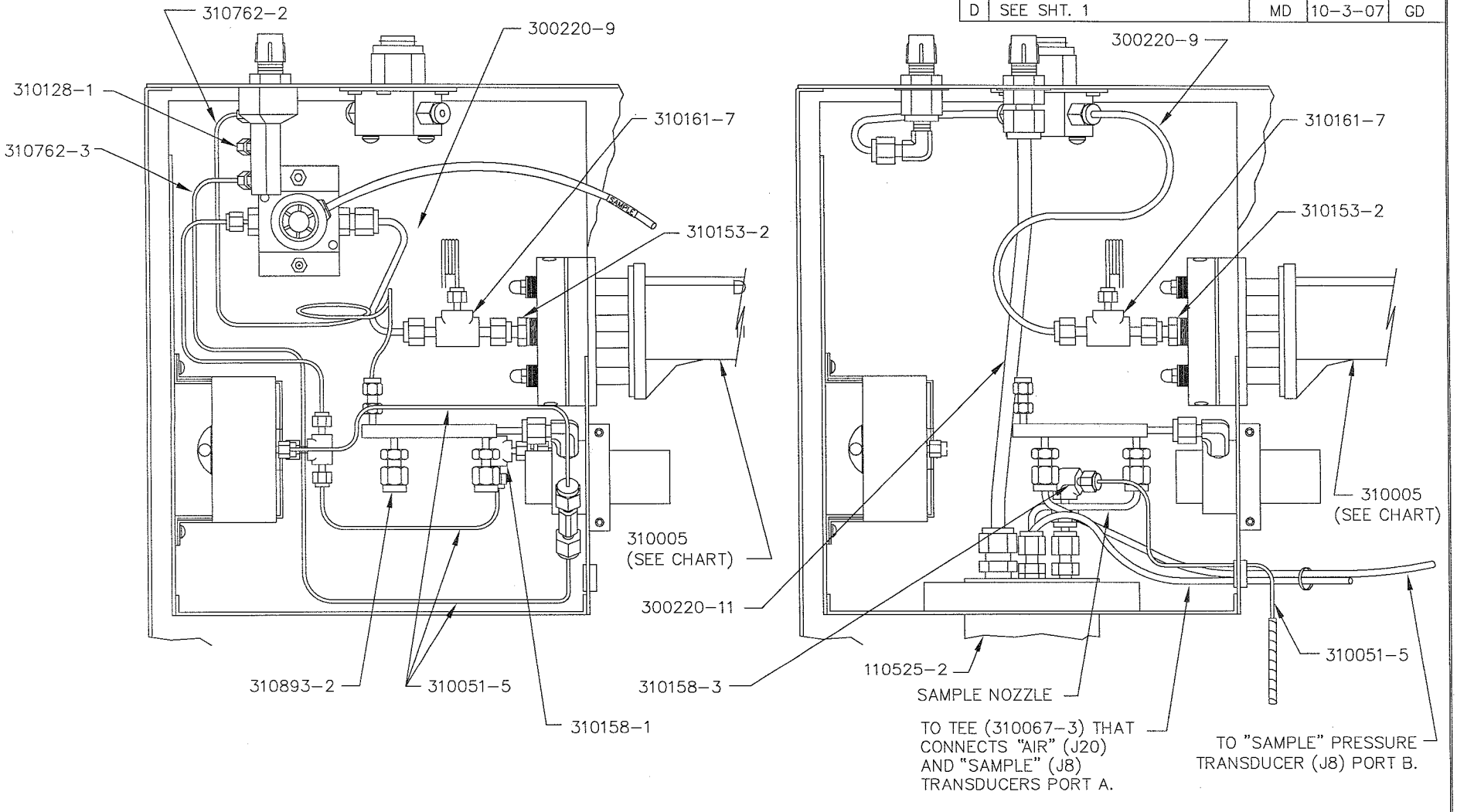
REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD



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SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE –		SHEET 24 OF 27	

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD

TOP ASSY	VOLTAGE	PUMP
110717-1	115V/60HZ	110157-9
110717-2	230V/50HZ	110157-10

QTY. REQ'D	REV.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ITEM NO.
4		874800	NUT HEX KEPS YL 8-32		12
4		649403	SCREW PH SEMS YL 8-32 X 1/4		11
1-		311006-2	TUBE 600-CLD EPC/REGULATOR		10
1		310438-1	PLATE MTG PUMP 100/200/300		9
4		310292-1	MOUNT VIBRATION RUBR M/F 8-32		8
1-		310235-1	REGULATOR PLASTIC 100 PSI		7
1-		310153-2	TUBE ADAPT MALE SS 1/8T-1/8NPT		6
4"		310046-1	TUBING SILICONE 3/32ID-7/32OD		5
1-		310002-5	CONN MALE SS 1/8T-1/8NPT		4
36"		300220-9	TUBING FEP BLK .125 OD X .031W		3
1		110840-1	ASSY CABLE GND SENSOR 02 650-NOXYGEN		2
1		110157	ASSY CABLE PUMP ATMOSPHERIC BP 115V	SEE CHART	1

PART LIST

USED ON

APPROVALS	DATE
DRAWN M. DELACRUZ	6-22-07
CHECKED G. DeMINT	6-22-07
ISSUED	

CAI

OPTION OZONE PUMP
600-CLD

SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D

SCALE 1/1 SHEET 26 OF 27

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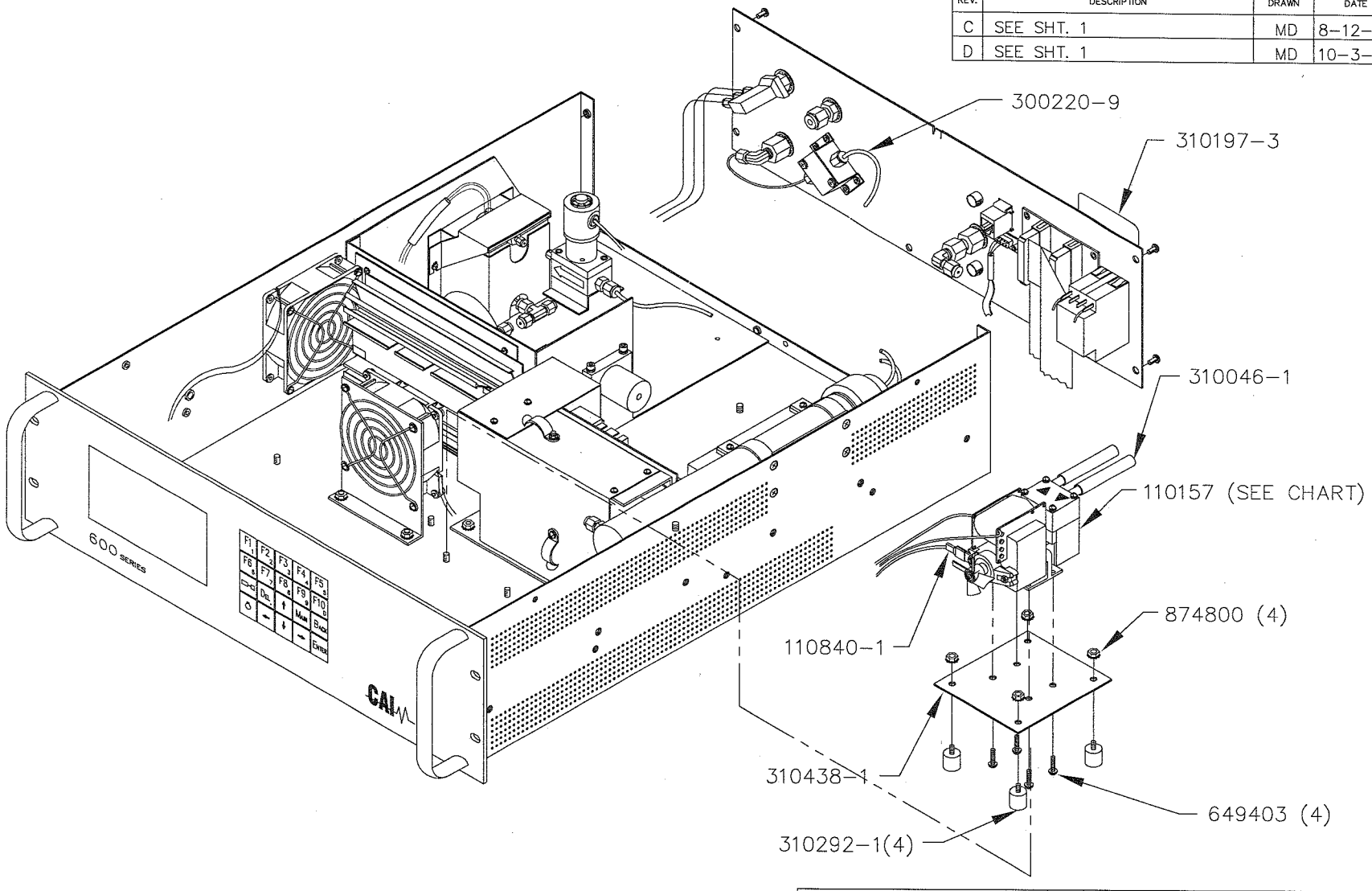
REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED
C	SEE SHT. 1	MD	8-12-07	GD
D	SEE SHT. 1	MD	10-3-07	GD



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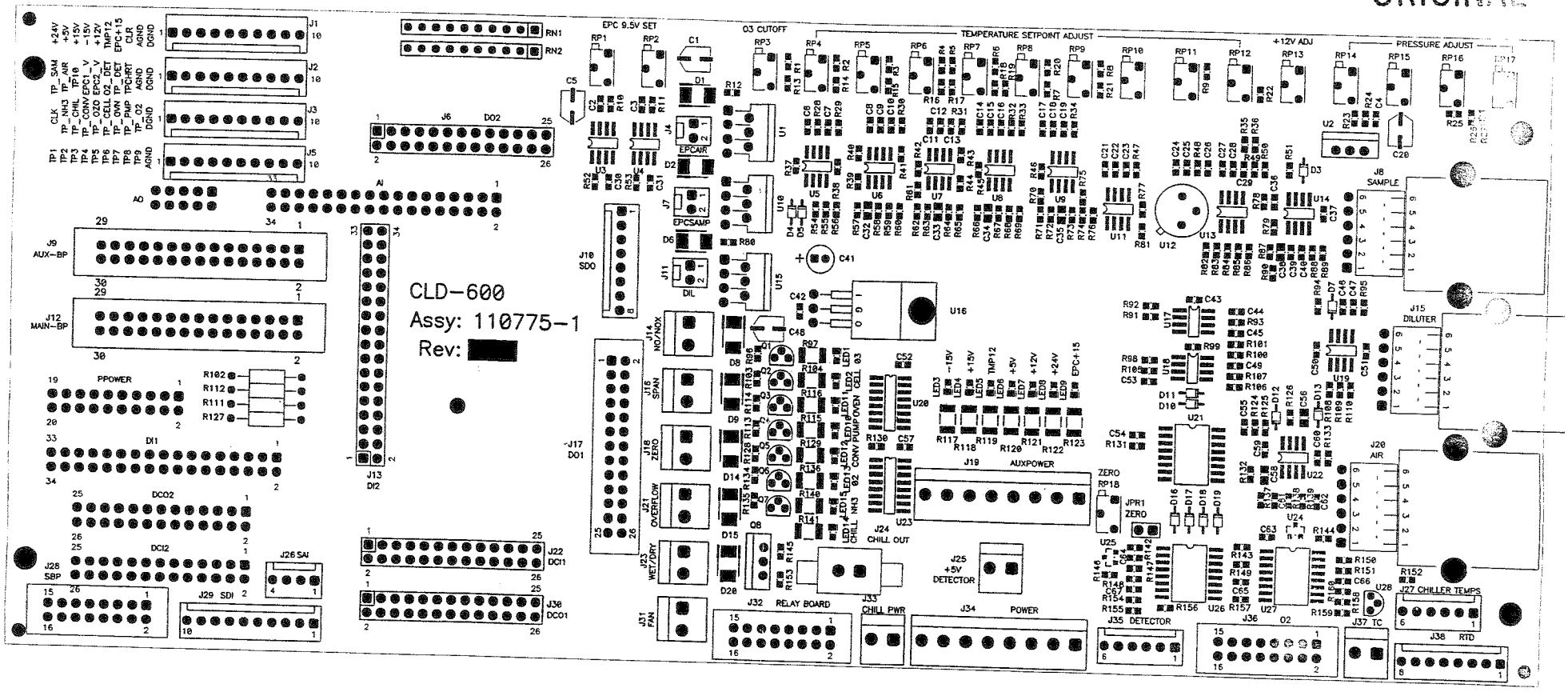
SIZE	FSCM NO.	DWG. NO.	REV.
B		110717	D
SCALE 7/32		SHEET 27 OF 27	

2. NOx Main Board

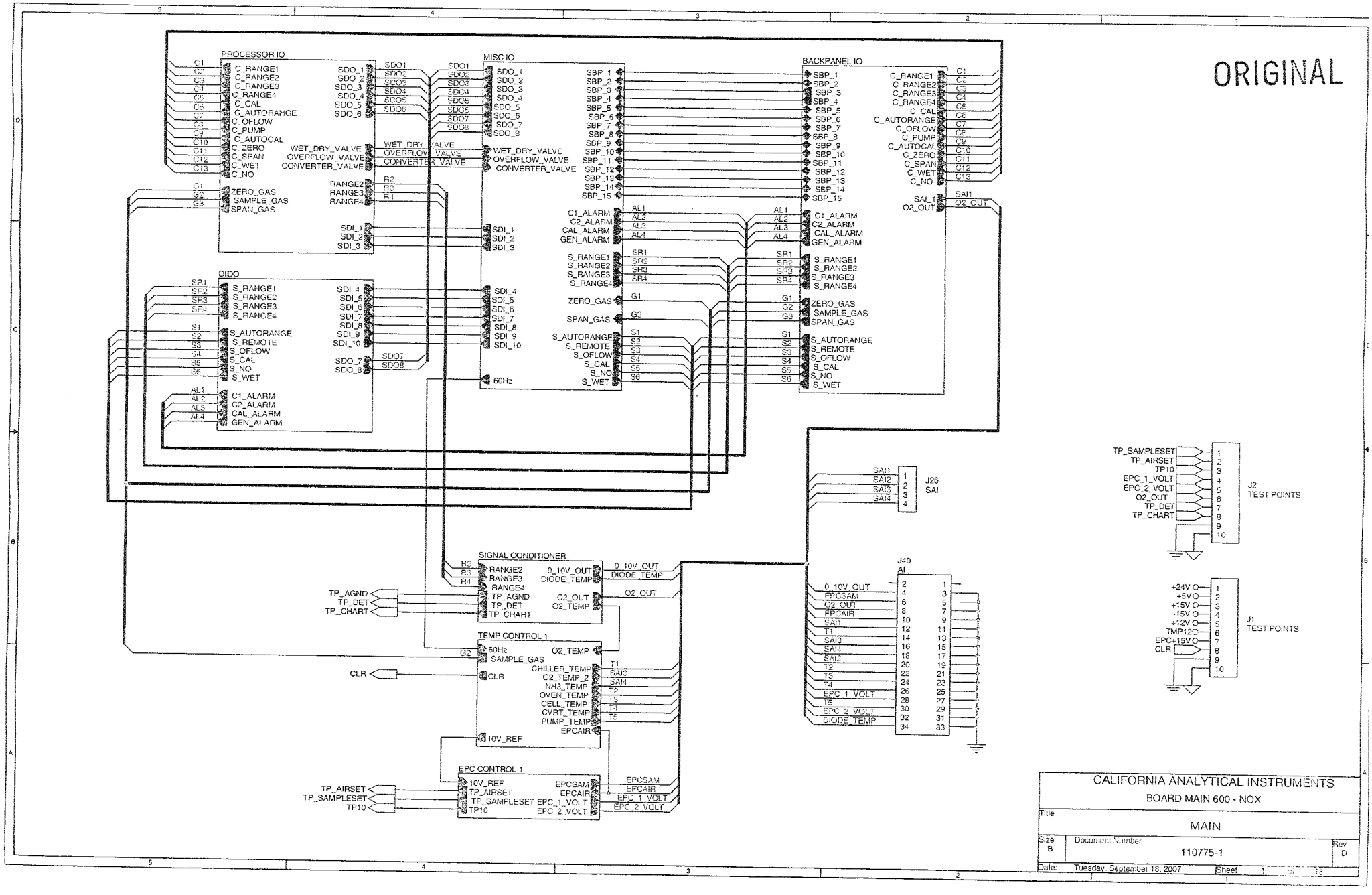
ORIGINAL



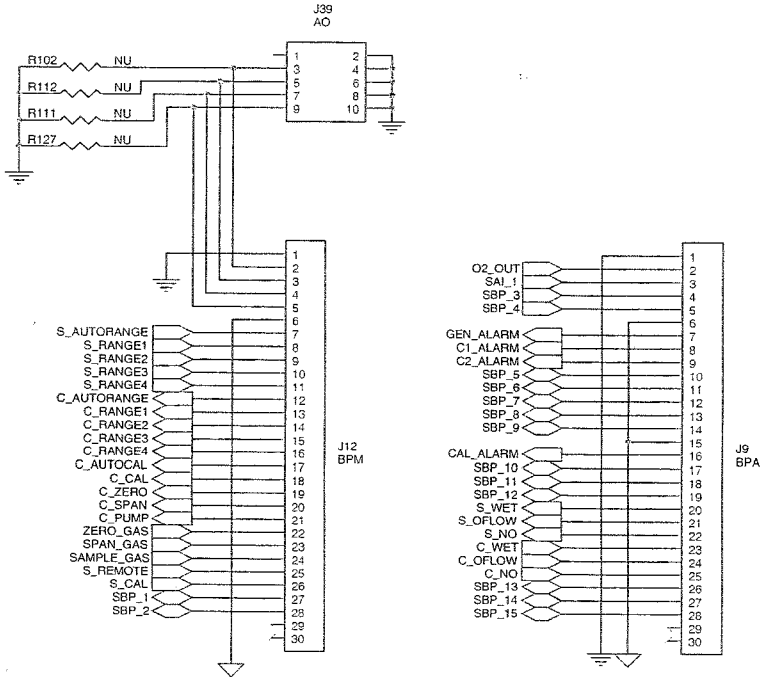
110775-1 REV D

ASSY BOARD MAIN 600 NOX

SILKSCREEN TOP SIDE


ORIGINAL
PROCESSOR IO
C_RANGE1
C_RANGE2
C_RANGE3
C_RANGE4
C_CAL
C_AUTORANGE
C_OFLOW
C_PUMP
C_AUTOCAL
C_ZERO
C_SPAN
C_WET
C_NO
ZERO_GAS
SAMPLE_GAS
SPAN_GAS
WET_DRY_VALVE
OVERFLOW_VALVE
CONVERTER_VALVE
MISC IO
BACKPANEL IO
DIDO
S_RANGE1
S_RANGE2
S_RANGE3
S_RANGE4
S_AUTORANGE
S_REMOTE
S_OFLOW
S_CAL
S_NO
S_WET
C1_ALARM
C2_ALARM
CAL_ALARM
GEN_ALARM
60Hz
SIGNAL CONDITIONER
RANGE2
RANGE3
RANGE4
0_10V_OUT
DIODE_TEMP
O2_OUT
O2_TEMP
TP_AGND
TP_DET
TP_CHART
TEMP CONTROL 1
60Hz
SAMPLE_GAS
O2_TEMP
CLR
CHILLER_TEMP
O2_TEMP_2
NH3_TEMP
OVEN_TEMP
CELL_TEMP
CVRT_TEMP
PUMP_TEMP
EPCAIR
10V_REF
EPC CONTROL 1
TP_AIRSET
TP_SAMPLESET
TP10
EPCSAM
EPC_1_VOLT
EPC_2_VOLT
J26
SAI
J40
AI
J2
TEST POINTS
J1
TEST POINTS
CALIFORNIA ANALYTICAL INSTRUMENTS
BOARD MAIN 600 - NOX
MAIN
110775-1
Tuesday, September 18, 2007

ORIGINAL

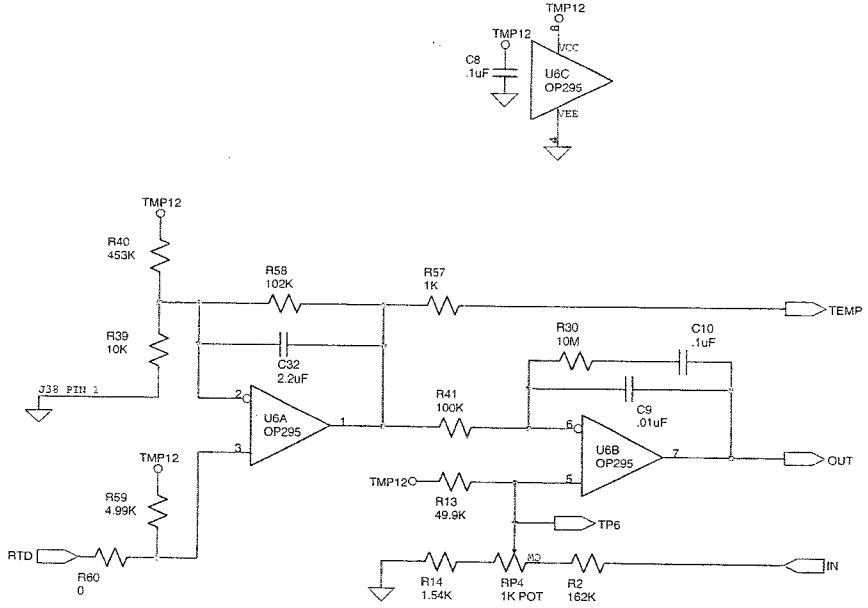


CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: BACKPANEL IO		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 2 of 18	

NOTES:

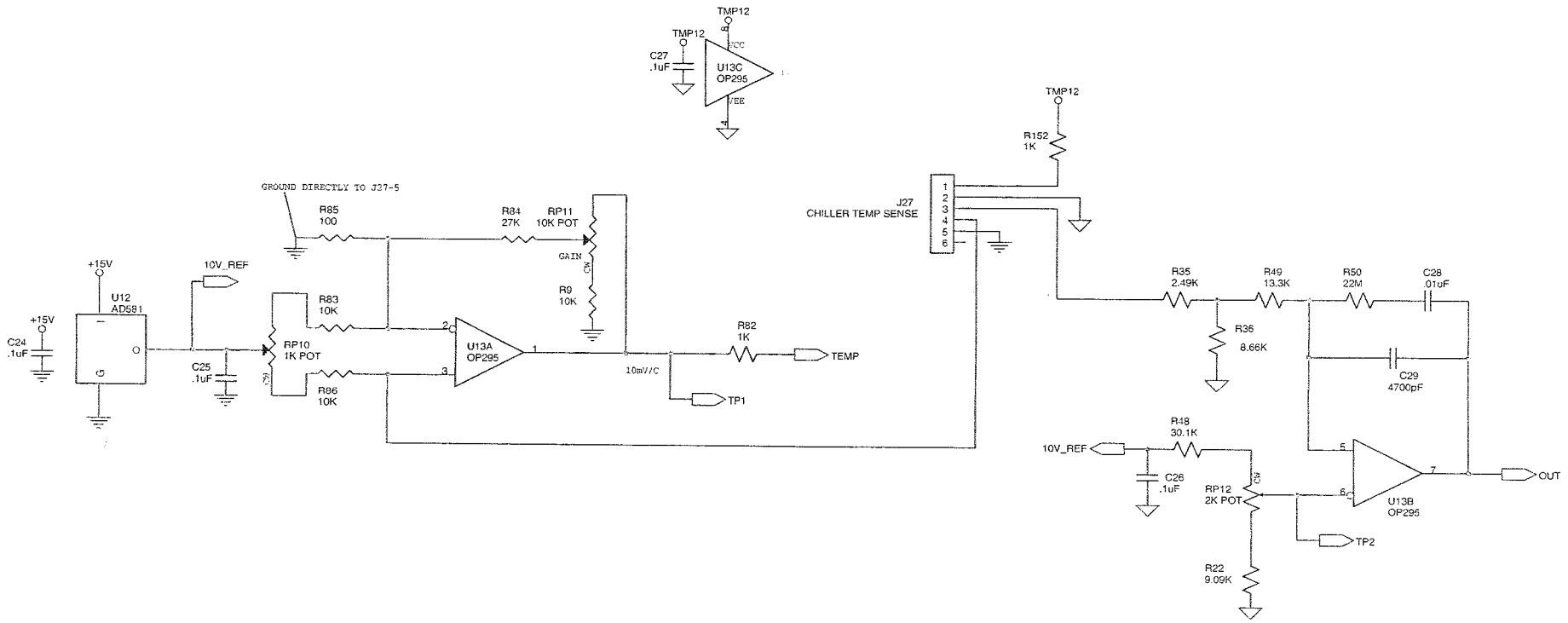
1. SEE TEMP CONTROL 1 FOR OTHER RTD CONNECTIONS TO GROUND
2. GROUND POINT SHOULD BE AT R39

ORIGINAL



CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: CELL		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 3 of 18	

ORIGINAL

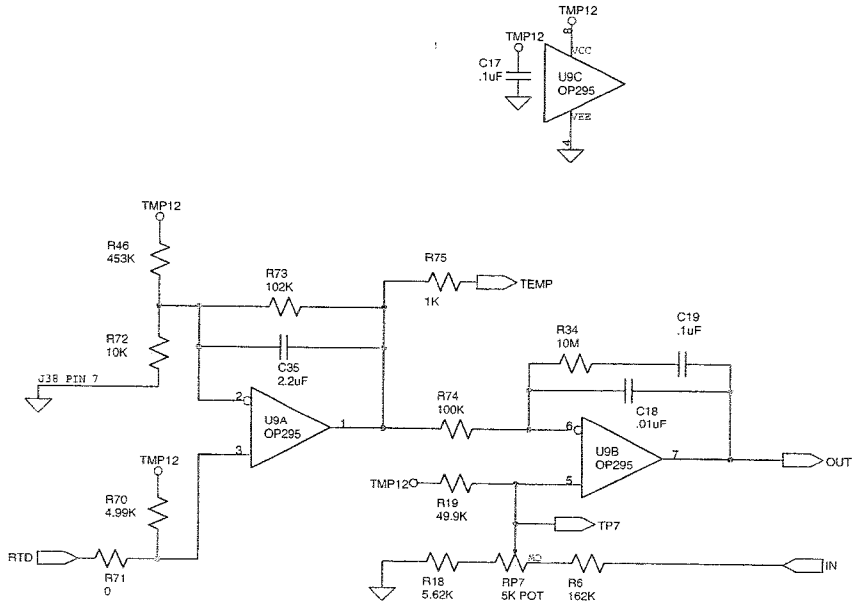


CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: CHILLER		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 4 of 18	

NOTES:

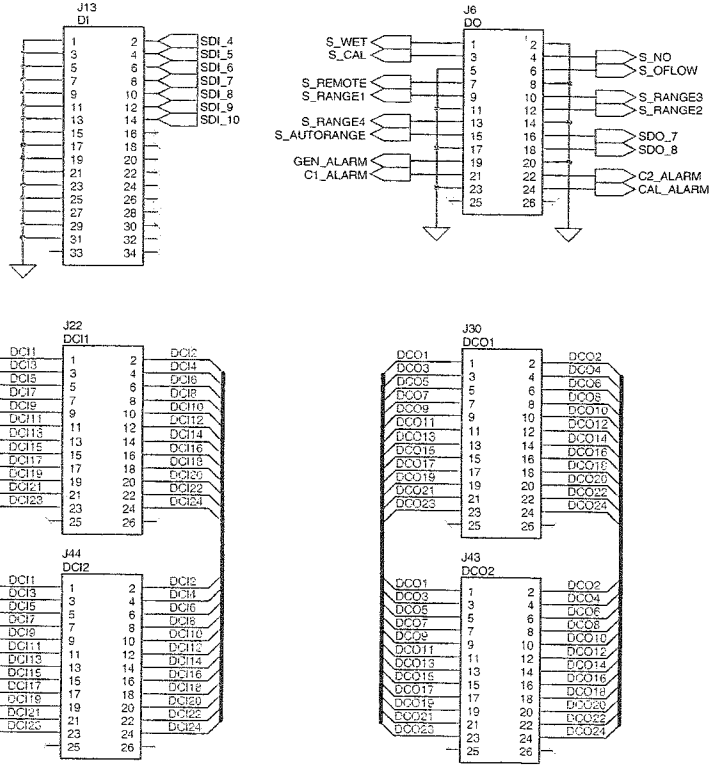
1. SEE TEMP CONTROLLER 1 FOR OTHER RTD CONNECTIONS TO GROUND
2. GROUND POINT SHOULD BE AT R72

ORIGINAL

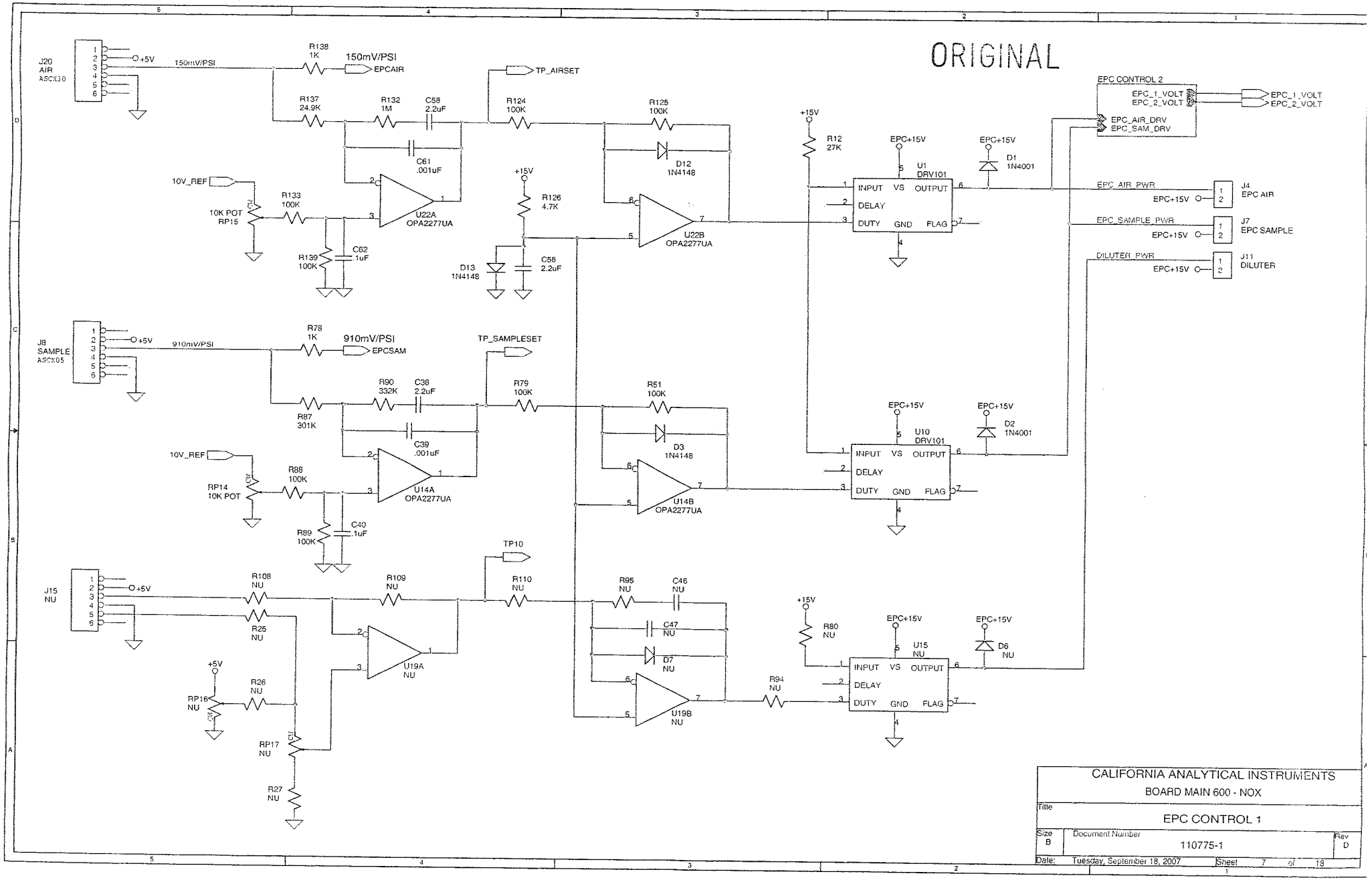


CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: CVRT		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 5 ... 18	

ORIGINAL



CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: DIDO		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 6 of 18	


ORIGINAL
J20
AIR
ASCX30
+5V
150mV/PSI
R138
1K
150mV/PSI
EPCAIR
TP_AIRSET
R137
24.9K
R132
1M
C58
2.2uF
C61
.001uF
R124
100K
R125
100K
D12
1N4148
10V_REF
10K POT
RP15
R133
100K
U22A
OPA2277UA
R126
4.7K
R139
100K
C62
.1uF
D13
1N4148
C56
2.2uF
U22B
OPA2277UA
+15V
R12
27K
U1
DRV101
INPUT
VS
OUTPUT
DELAY
DUTY
GND
FLAG
EPC+15V
D1
1N4001
EPC CONTROL 2
EPC_1_VOLT
EPC_2_VOLT
EPC_AIR_DRV
EPC_SAM_DRV
EPC_AIR_PWR
J4
EPC AIR
EPC_SAMPLE_PWR
J7
EPC SAMPLE
DILUTER_PWR
J11
DILUTER
J8
SAMPLE
ASCX05
910mV/PSI
R78
1K
EPCSAM
TP_SAMPLESET
R90
332K
C38
2.2uF
R87
301K
C39
.001uF
R79
100K
R51
100K
D3
1N4148
10V_REF
RP14
10K POT
R88
100K
U14A
OPA2277UA
R89
100K
C40
.1uF
U14B
OPA2277UA
U10
DRV101
D2
1N4001
J15
NU
TP10
R108
NU
R109
NU
R110
NU
R25
NU
U19A
NU
R95
NU
C46
NU
C47
NU
D7
NU
U19B
NU
R94
NU
R80
NU
U15
NU
D6
NU
+5V
RP16
NU
R26
NU
RP17
NU
R27
NU
CALIFORNIA ANALYTICAL INSTRUMENTS
BOARD MAIN 600 - NOX
Title
EPC CONTROL 1
Size
B
Document Number
110775-1
Rev
D
Date:
Tuesday, September 18, 2007
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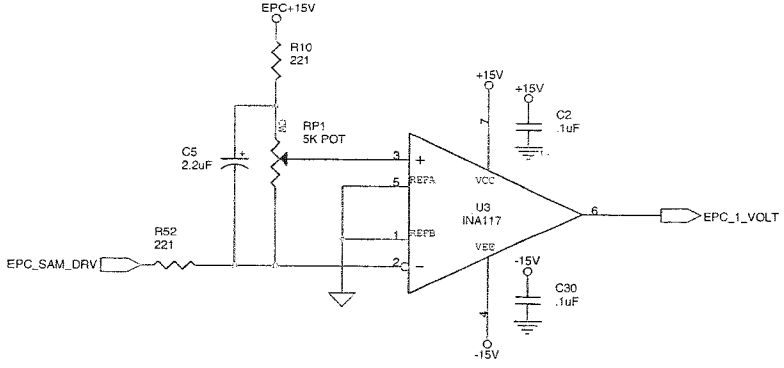
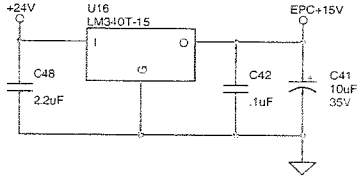
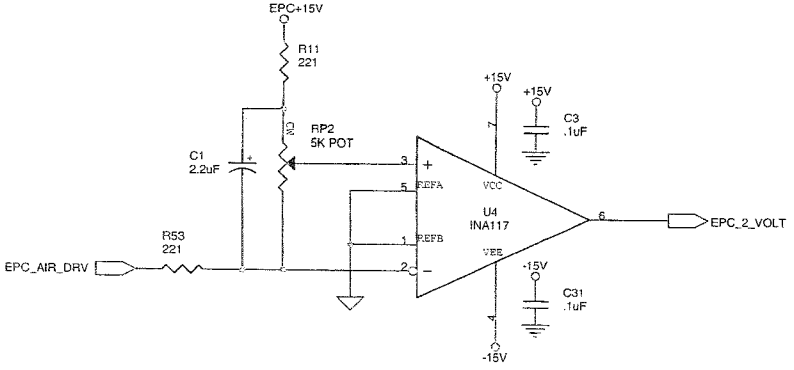
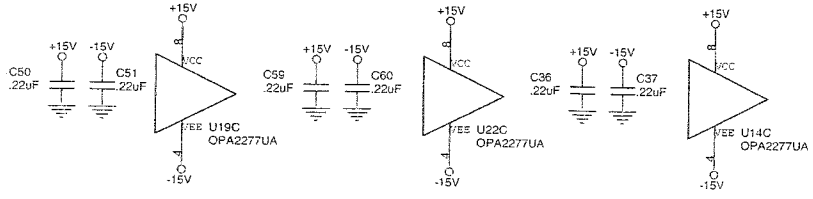
7
of
18

ORIGINAL



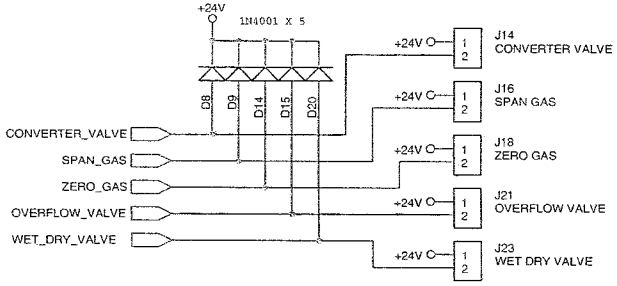


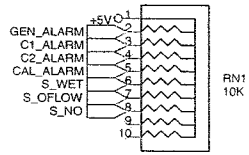


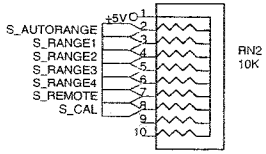


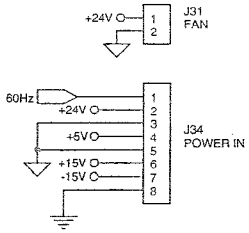
CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: EPC CONTROL 2		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 8 of 18	

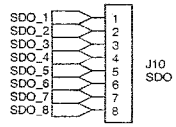
ORIGINAL

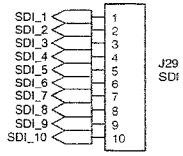


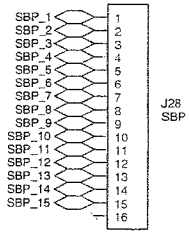


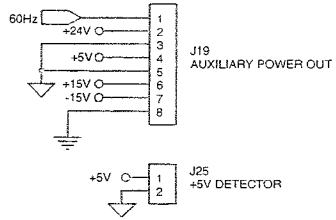




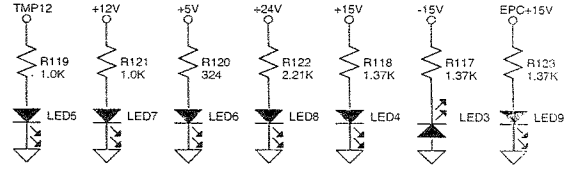






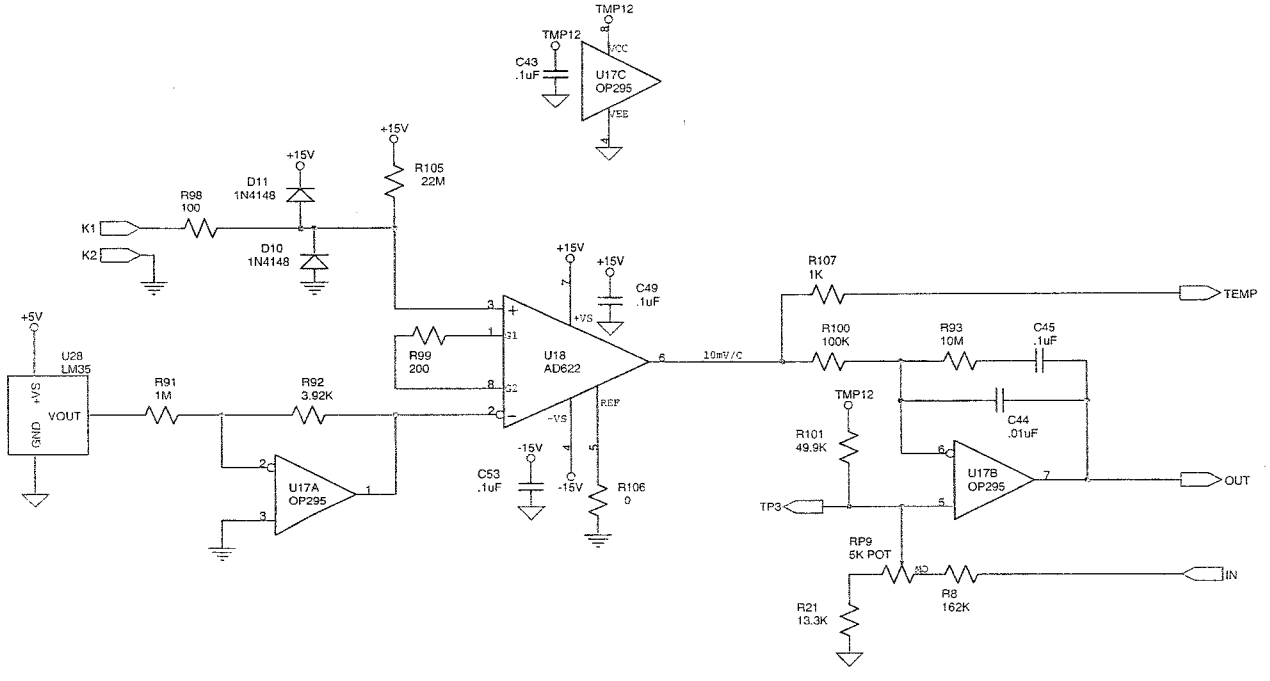


POWER STATUS LEDS



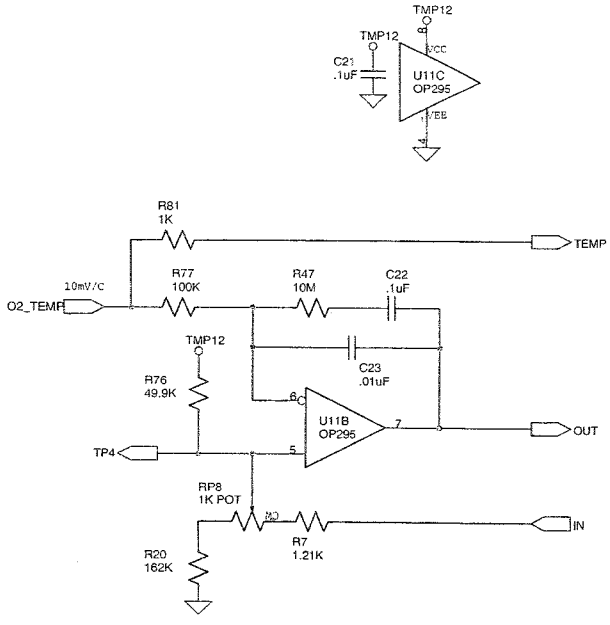
CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: MISC IO		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 9 of 18	

ORIGINAL



CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: NH3		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 10 of 18	

ORIGINAL

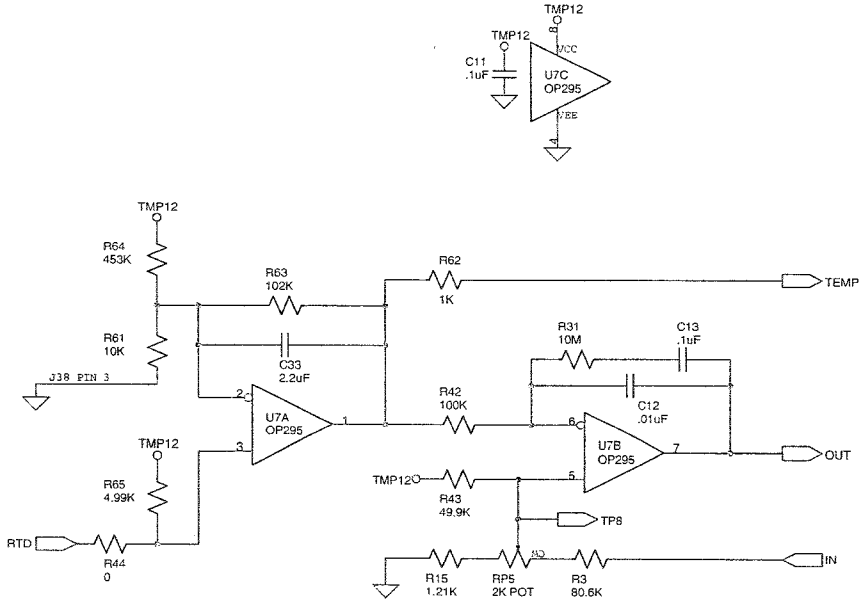


CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: O2		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 11 of 18	

NOTES:

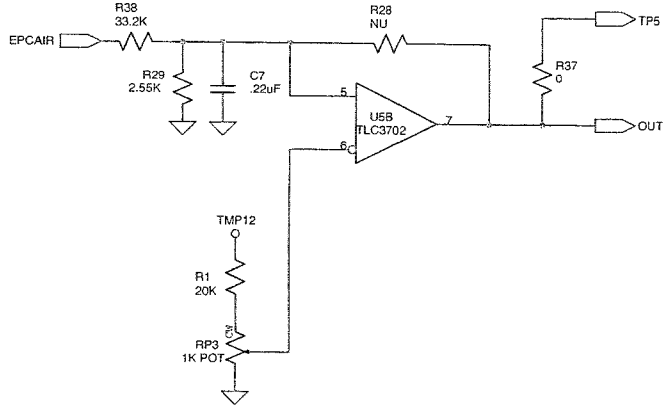
1. SEE TEMP CONTROLLER 1 FOR OTHER RTD CONNECTIONS TO GROUND
2. GROUND POINT SHOULD BE AT R61

ORIGINAL



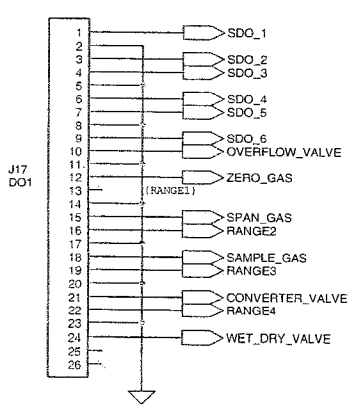
CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: OVEN		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 12 of 16	

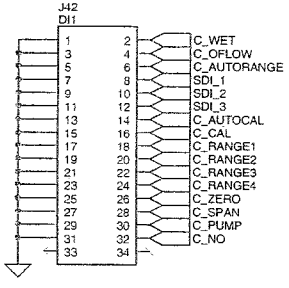
ORIGINAL

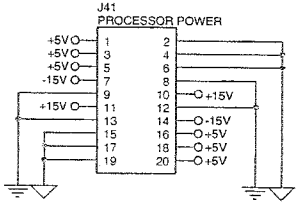


CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: OZONE		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 13 of 18	

ORIGINAL







CALIFORNIA ANALYTICAL INSTRUMENTS

BOARD MAIN 600 - NOX

Title: PROCESSOR IO

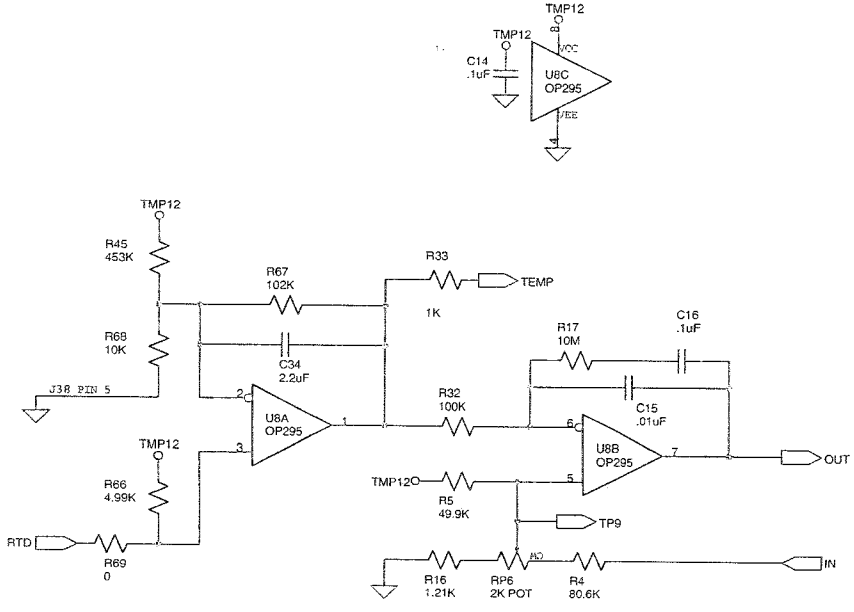
Size: B | Document Number: 110775-1 | Rev: D

Date: Tuesday, September 18, 2007 | Sheet 14 of 18

NOTES:

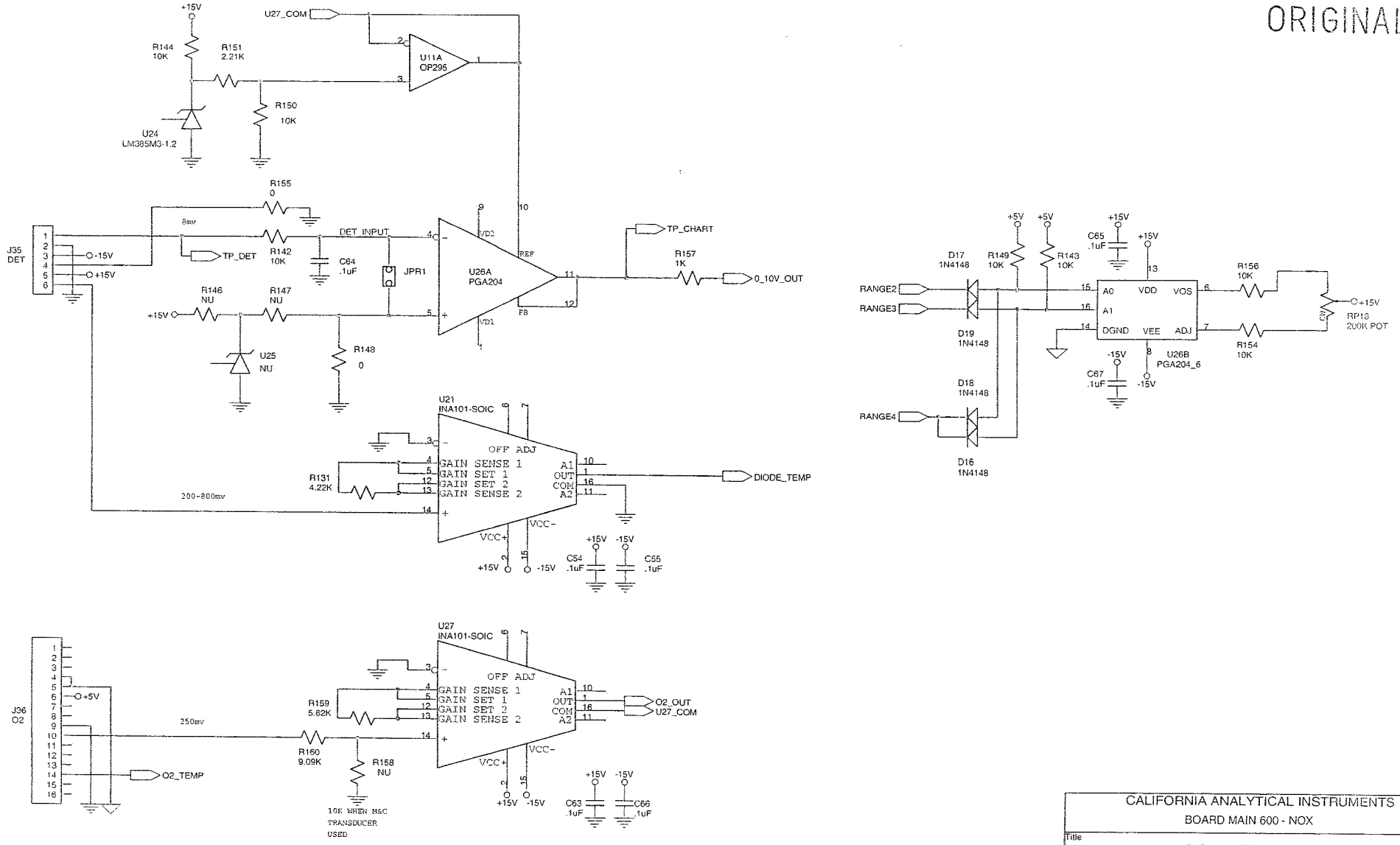
1. SEE TEMP CONTROLLER 1 FOR OTHER RTD CONNECTIONS TO GROUND
2. GROUND POINT SHOULD BE AT R68

ORIGINAL

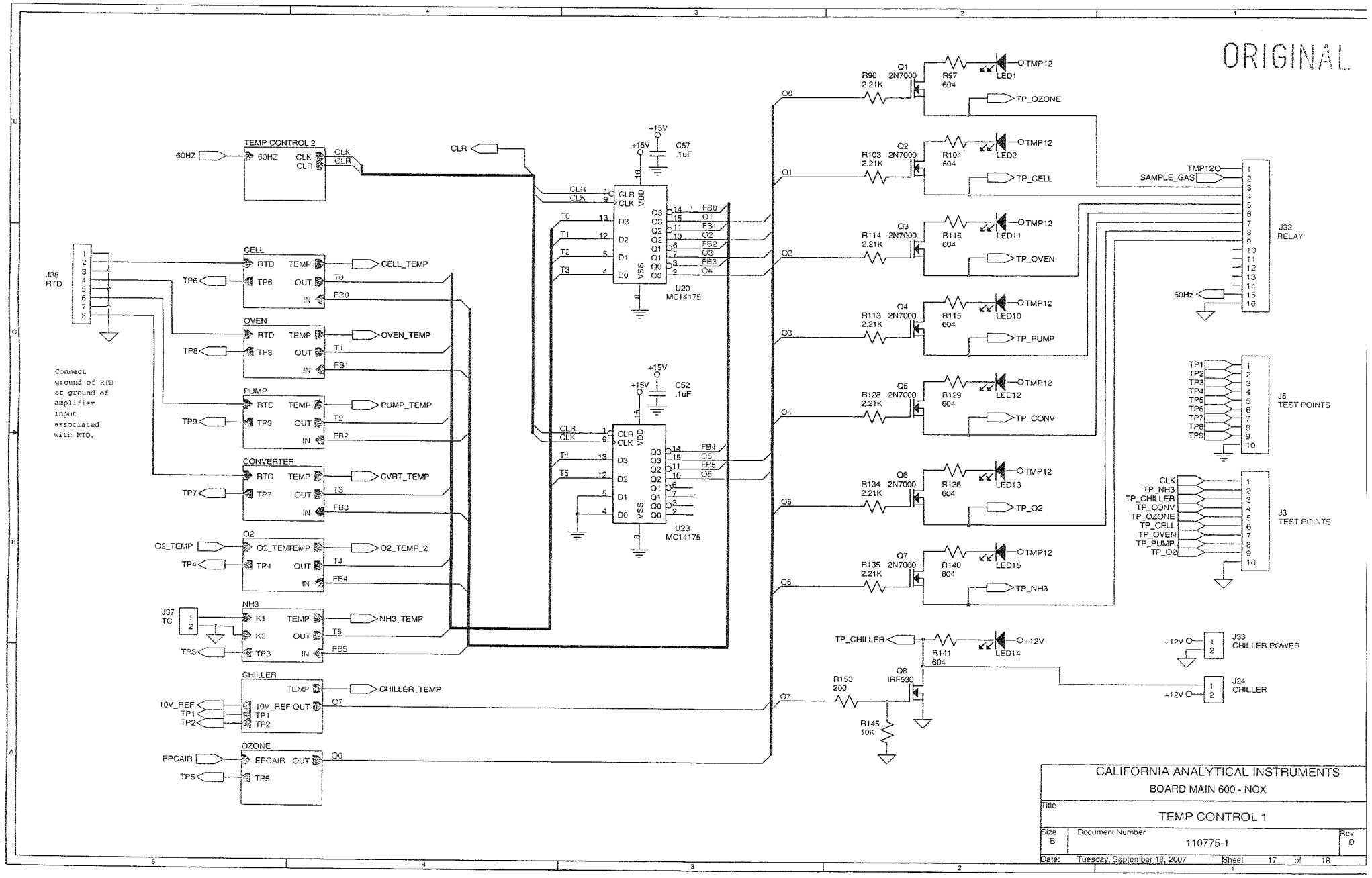


CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: PUMP		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 15 of 18	

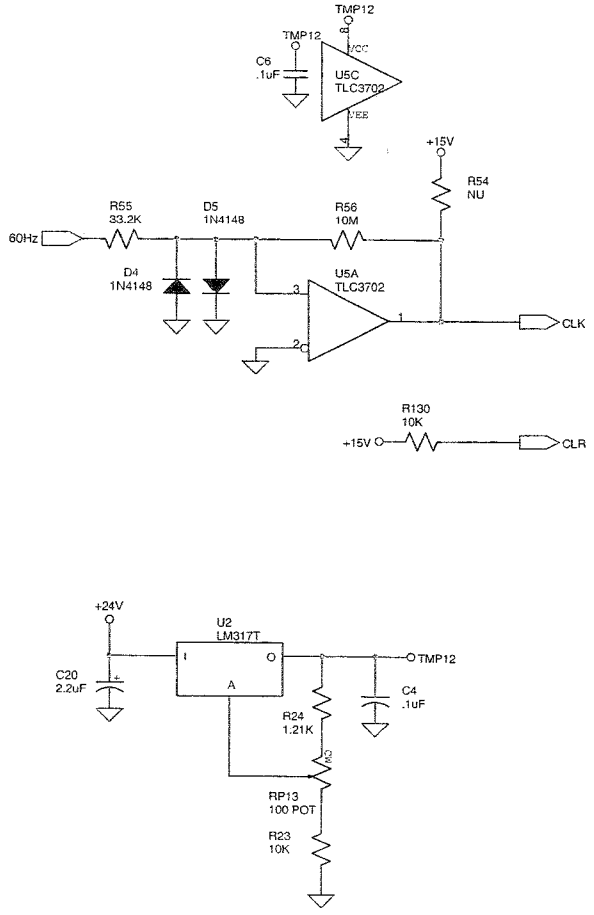
ORIGINAL



CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: SIGNAL CONDITIONER		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 16 of 18	


ORIGINAL
TEMP CONTROL 2
60HZ
CLR
+15V
C57
.1uF
C52
.1uF
U20
MC14175
U23
MC14175
J38
RTD
Connect ground of RTD at ground of amplifier input associated with RTD.
CELL
CELL_TEMP
OVEN
OVEN_TEMP
PUMP
PUMP_TEMP
CONVERTER
CVRT_TEMP
O2
O2_TEMP_2
NH3
NH3_TEMP
J37
TC
CHILLER
CHILLER_TEMP
10V_REF
OZONE
EPCAIR
Q1 2N7000
Q2 2N7000
Q3 2N7000
Q4 2N7000
Q5 2N7000
Q6 2N7000
Q7 2N7000
Q8 IRF530
LED1
LED2
LED11
LED10
LED12
LED13
LED15
LED14
TP_OZONE
TP_CELL
TP_OVEN
TP_PUMP
TP_CONV
TP_O2
TP_NH3
TP_CHILLER
J32
RELAY
SAMPLE_GAS
60Hz
J5
TEST POINTS
J3
TEST POINTS
J33
CHILLER POWER
J24
CHILLER
CALIFORNIA ANALYTICAL INSTRUMENTS
BOARD MAIN 600 - NOX
TEMP CONTROL 1
Size B
Document Number 110775-1
Rev D
Date: Tuesday, September 18, 2007
Sheet 17 of 18

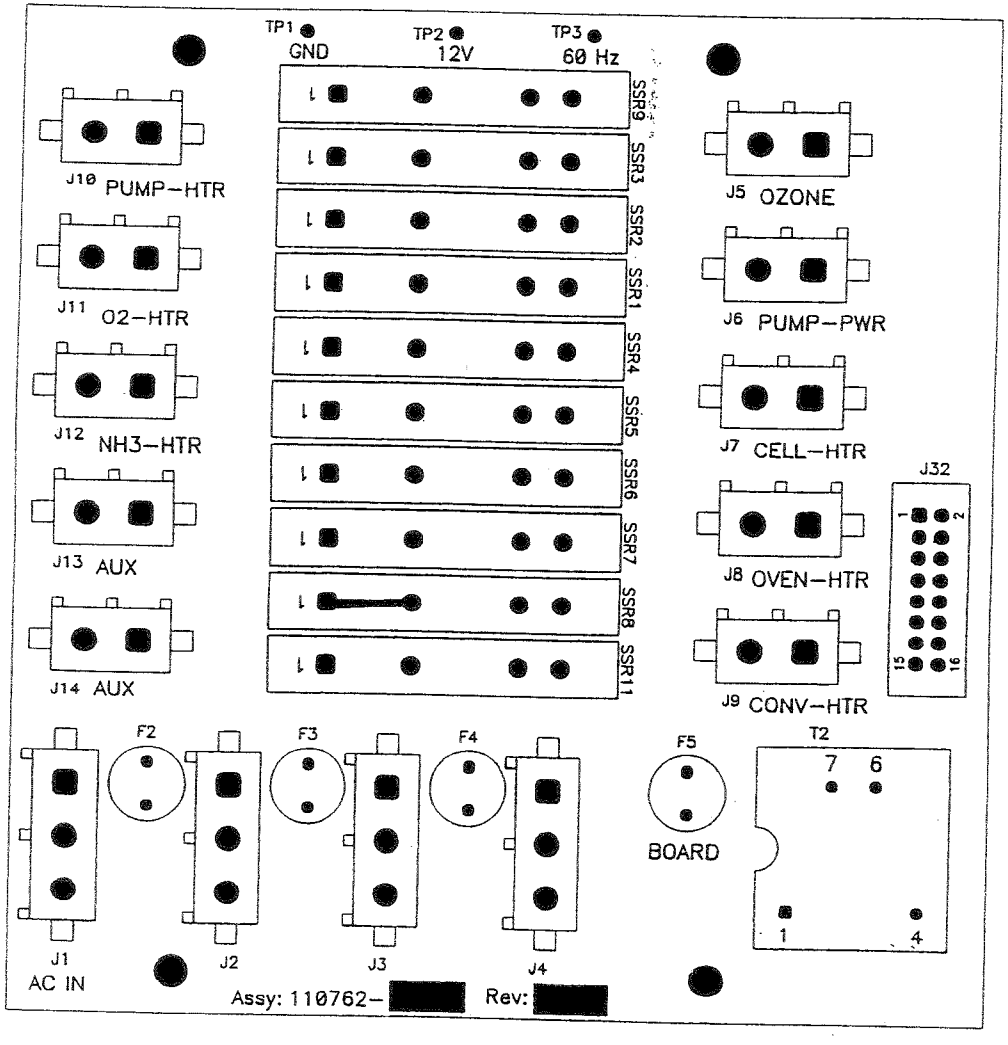
ORIGINAL



CALIFORNIA ANALYTICAL INSTRUMENTS		
BOARD MAIN 600 - NOX		
Title: TEMP CONTROL 2		
Size: B	Document Number: 110775-1	Rev: D
Date: Tuesday, September 18, 2007	Sheet 18 of 18	

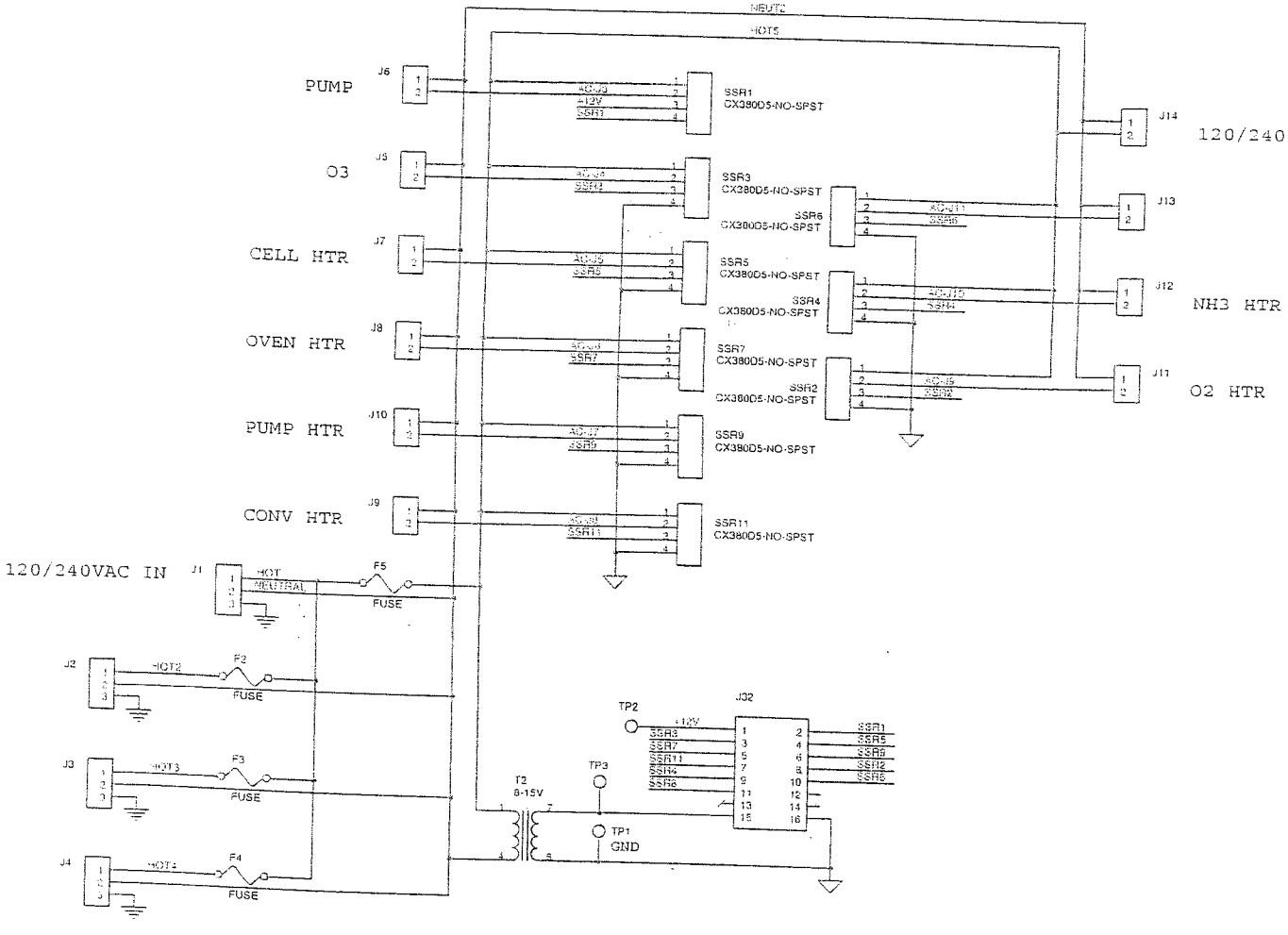
3. Relay Board

ORIGINAL



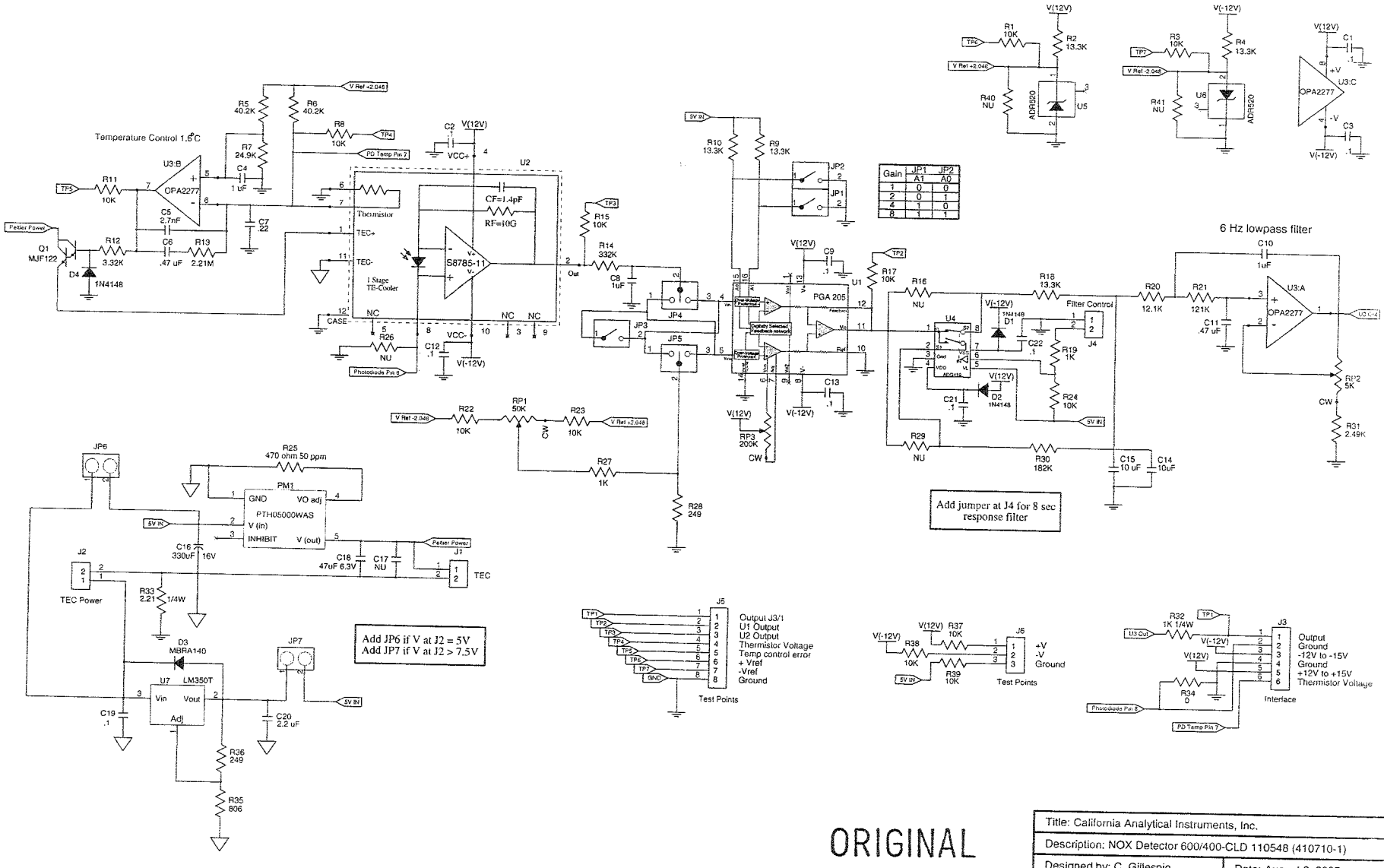
110762-1 Rev C
Assy Board Relay 600-CLD 115V
Silkscreen

ORIGINAL



Title	600 RELAY BOARD	
Size: B	Document Number: 110762	Rev: C
Date: Tuesday, July 26, 2005	Sheet 1 of 1	

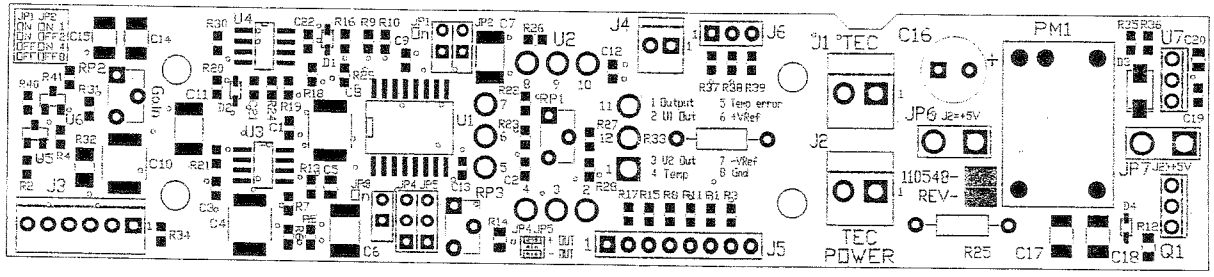
4. Detector Board



ORIGINAL

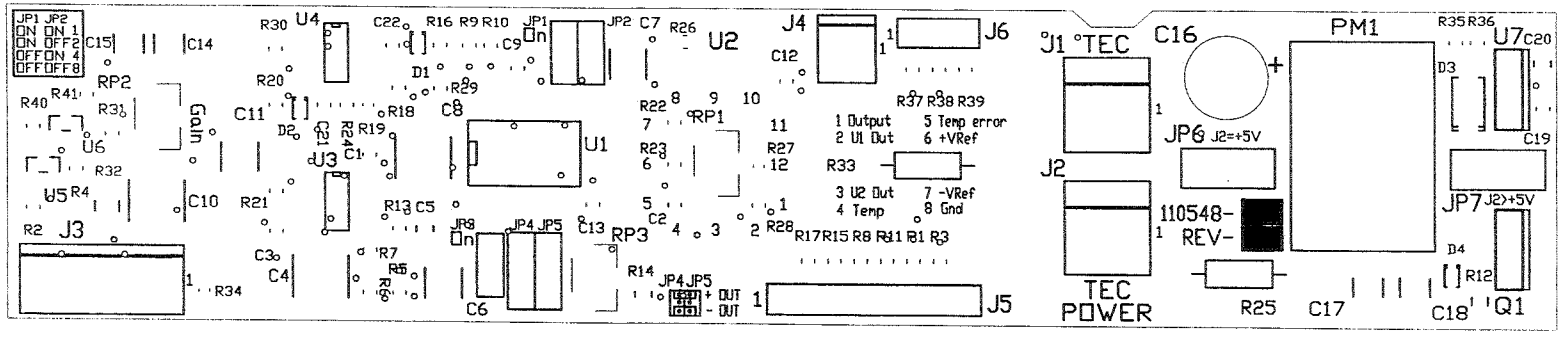
Title: California Analytical Instruments, Inc.		
Description: NOX Detector 600/400-CLD 110548 (410710-1)		
Designed by: C. Gillespie	Date: August 3, 2005	
Checked by:	Doc. No.:	Revision: E
Approved by:	Sheet 1 of 1	Size: B

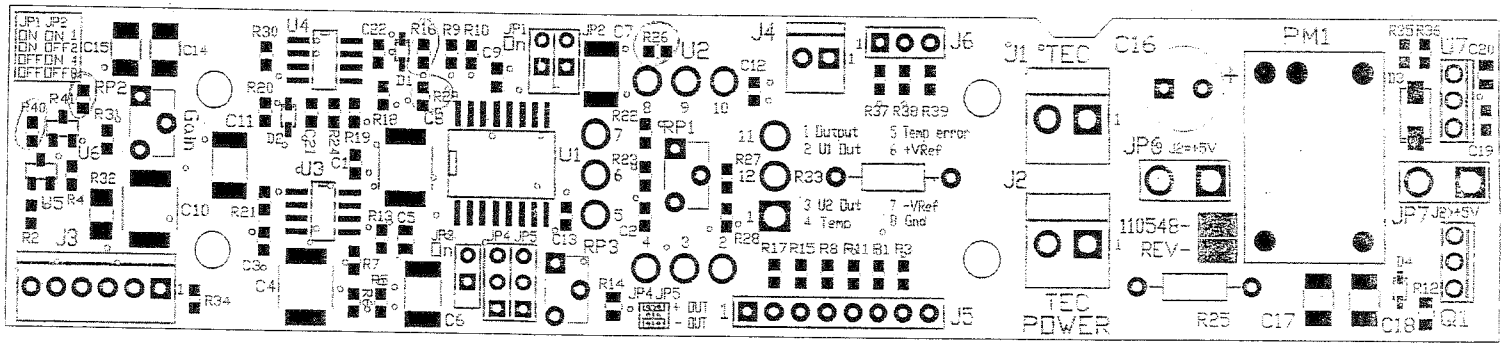
ORIGINAL



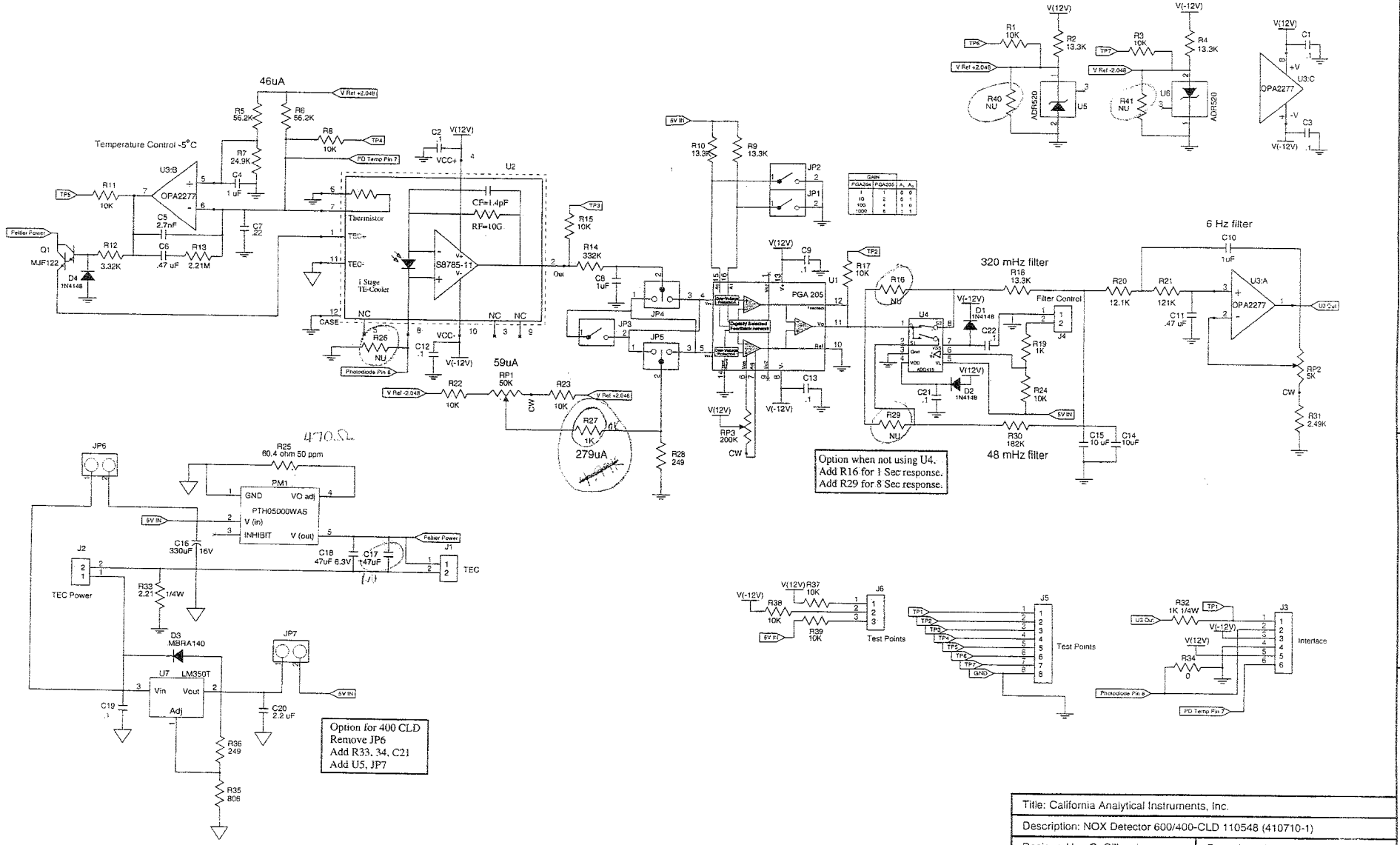
Title: California Analytical Instruments, Inc.		
Description: NOX Detector 600/400-CLD		
Designed by: C. Gillespie	Date: May 5, 2005	
Checked by:	Doc. No.: 110548	Revision: D
Approved by:	Sheet 1 of 1	Size: Custom

ORIGINAL

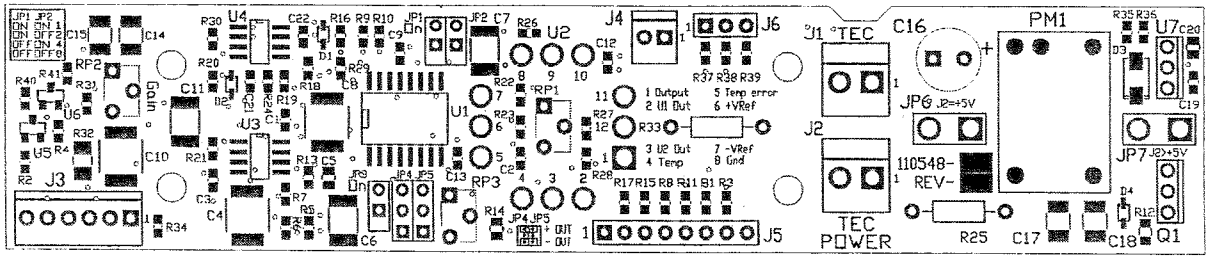

JP1 JP2
ON ON 1
ON OFF2
OFF ON 4
OFF OFF8
C15
C14
R30
U4
C22
R16
R9
R10
JP1
On
JP2
C7
R26
U2
J4
J6
C12
D1
R29
R20
C11
R18
C8
R22
RP1
R37
R38
R39
1 Output
2 U1 Out
5 Temp error
6 +VRef
U6
R32
U5
R4
C10
R21
R19
U3
C1
U1
R23
R27
R33
3 U2 Out
4 Temp
7 -VRef
8 Gnd
R2
J3
R13
C5
C2
C13
RP3
R28
R17
R15
R8
R11
R1
R3
C3
C4
R7
R5
R6
JP3
JP4
JP5
R14
+ OUT
- OUT
C6
J5
J1
TEC
C16
PM1
R35
R36
U7
C20
D3
C19
JP6
J2=+5V
J2
JP7
J2=+5V
110548-
REV-
D4
R12
TEC
POWER
R25
C17
C18
Q1



Title: California Analytical Instruments, Inc.



Title: California Analytical Instruments, Inc.		
Description: NOX Detector 600/400-CLD 110548 (410710-1)		
Designed by: C. Gillespie	Date: June 30, 2005	
Checked by:	Doc. No.:	Revision: E
Approved by:	Sheet 1 of 1	Size: B



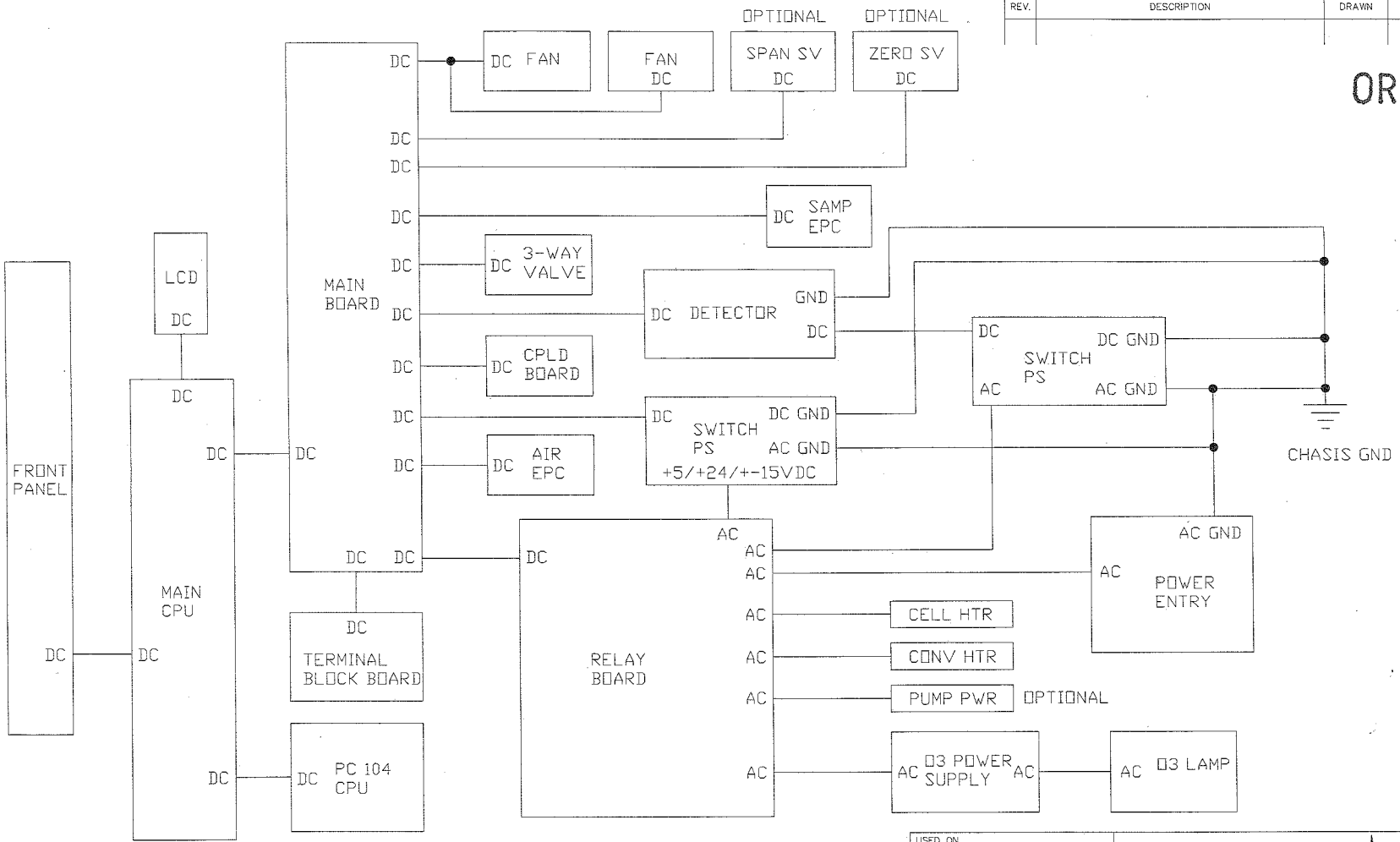
Title: California Analytical Instruments, Inc.		
Description: NOX Detector 600/400-CLD		
Designed by: C. Gillespie	Date: May 5, 2005	
Checked by:	Doc. No.: 110548	Revision: E
Approved by:	Sheet 1 of 1	Size: Custom

Section VII

Schematics

REVISIONS				
REV.	DESCRIPTION	DRAWN	DATE	APPROVED

ORIGINAL



USED ON CAI		CAI		
APPROVALS	DATE	ELECTRICAL BLOCK DIAGRAM 600-CLD		
DRAWN M. DELACRUZ	8-29-05			
CHECKED G. DeMINT	8-29-05	SIZE B	FSCM NO.	DWG. NO. 210154 REV.
ISSUED		SCALE 1/1	S.O.	SHEET 1

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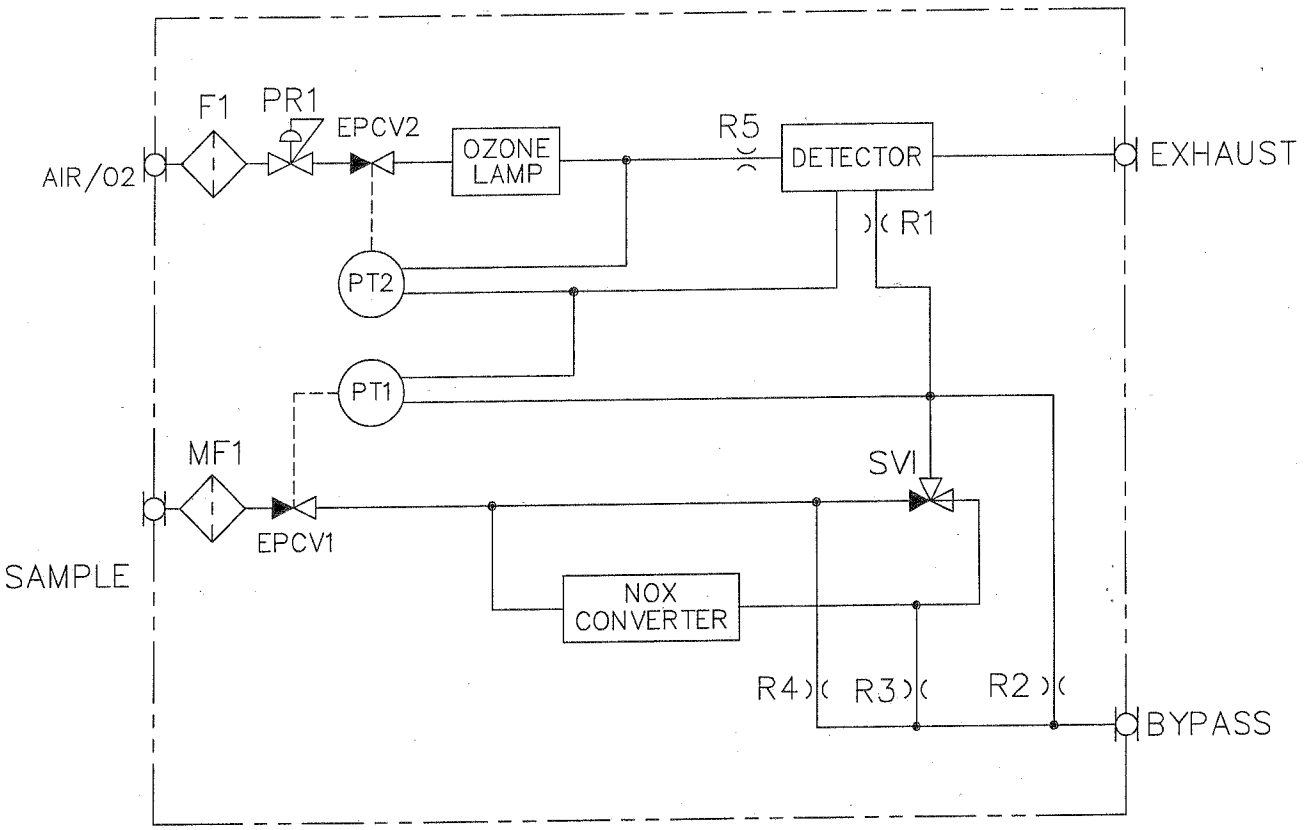
APPLICATION		REVISIONS				
NEXT ASSY	USED ON	REV.	DESCRIPTION	DRAWN	DATE	APPROVED



CAPILLARIES	SIZE	MATERIAL
R1–DETECTOR	1.75" .007	PEEK
R2–SAMPLE	17.5" .020	S.S.
R3–CONVERTER	20.0" .020	S.S.
R4–EPC	13.0" .030	S.S.
R5–OZONE LAMP	.45" .007	PEEK

ORIGINAL

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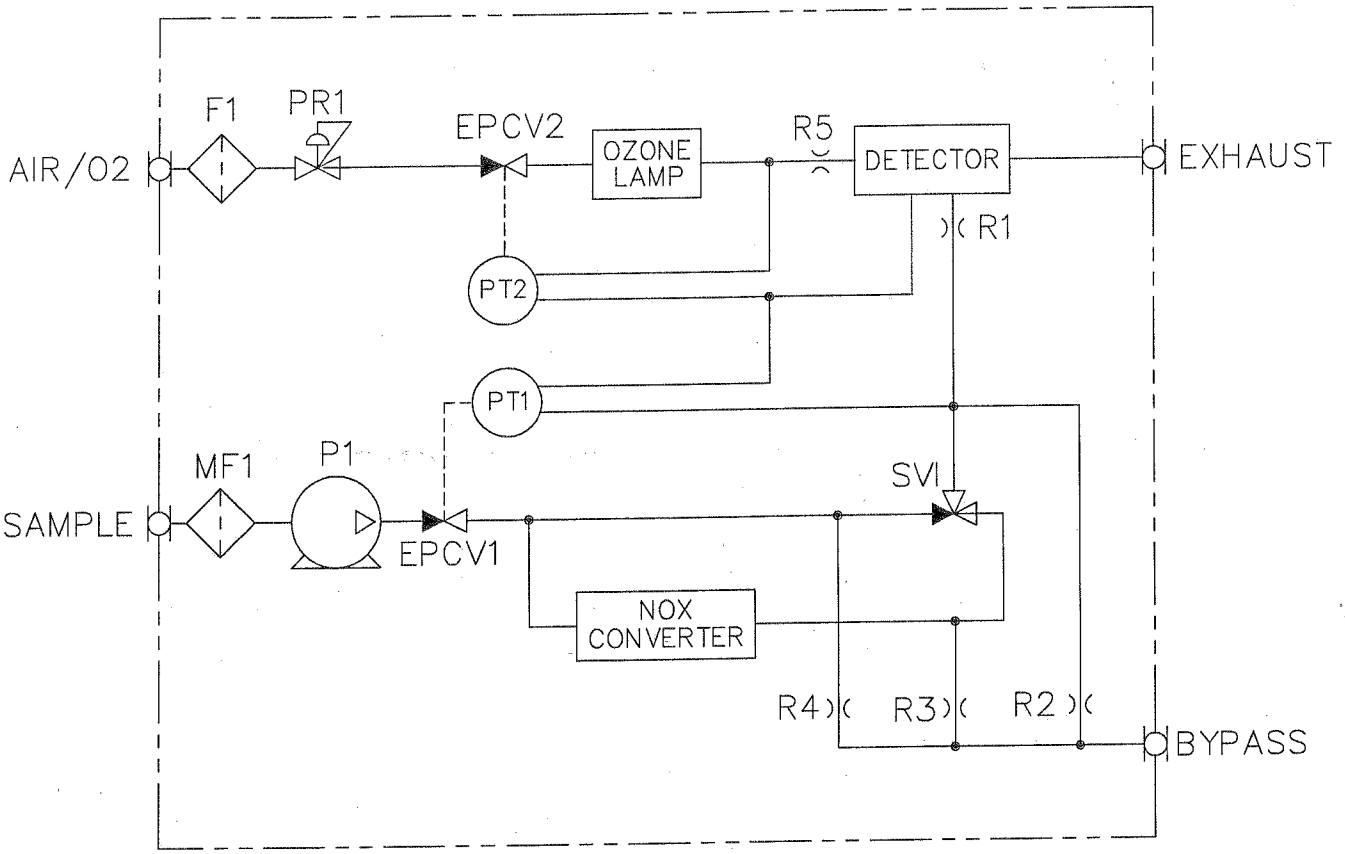
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm] TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX± ± .XXX±	CONTRACT NO.	gasanalyzers.com California Analytical Instruments, Inc.	
MATERIAL	APPROVALS	DATE	FLOW DIAGRAM, 600–CLD
	DRAWN D.B. WHITE	01–24–03	
FINISH	CHECKED D.B. WHITE	01–24–03	SIZE A / FSCM NO. / DWG. NO. 210061 / REV.
	ISSUED		
DO NOT SCALE DRAWING			SCALE / SHEET 1

APPLICATION		REVISIONS				
NEXT ASSY	USED ON	REV.	DESCRIPTION	DRAWN	DATE	APPROVED



CAPILLARIES	SIZE	MATERIAL
R1–DETECTOR	1.75" .007	PEEK
R2–SAMPLE	17.5" .020	S.S.
R3–CONVERTER	20.0" .020	S.S.
R4–EPC	13.0" .030	S.S.
R5–OZONE LAMP	.45" .007	PEEK

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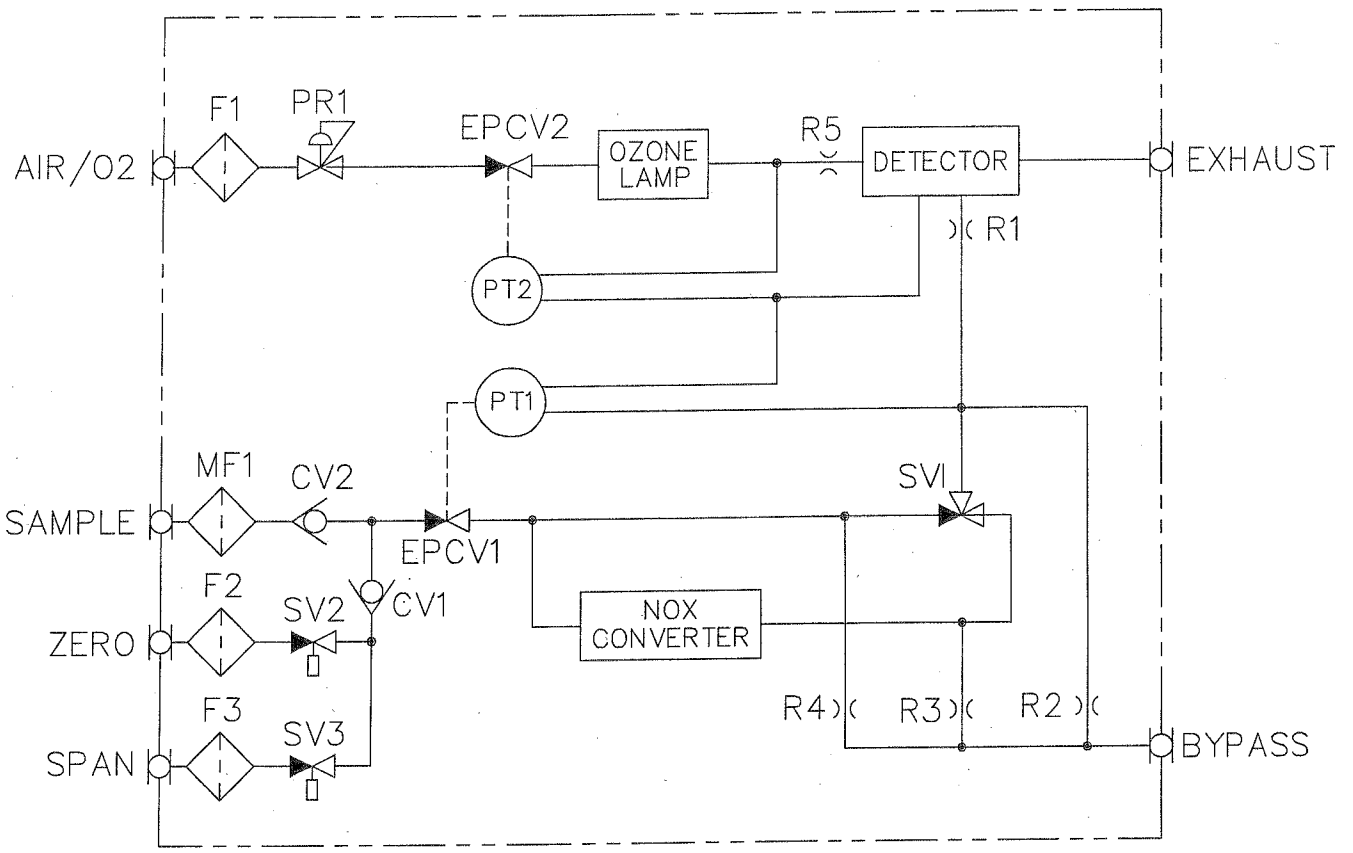
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm] TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX± ± .XXX±	CONTRACT NO.	gasanalyzers.com California Analytical Instruments, Inc.	
MATERIAL	APPROVALS	DATE	FLOW DIAGRAM, 600–CLD W/PUMP
	DRAWN G. GRISETA	1–27–03	
FINISH	CHECKED G. DEMINT	1–27–03	SIZE A / FSCM NO. / DWG. NO. 210063 / REV.
	ISSUED		
DO NOT SCALE DRAWING			SCALE / SHEET 1

APPLICATION		REVISIONS				
NEXT ASSY	USED ON	REV.	DESCRIPTION	DRAWN	DATE	APPROVED



CAPILLARIES	SIZE	MATERIAL
R1–DETECTOR	1.75" .007	PEEK
R2–SAMPLE	17.5" .020	S.S.
R3–CONVERTER	20.0" .020	S.S.
R4–EPC	13.0" .030	S.S.
R5–OZONE LAMP	.45" .007	PEEK

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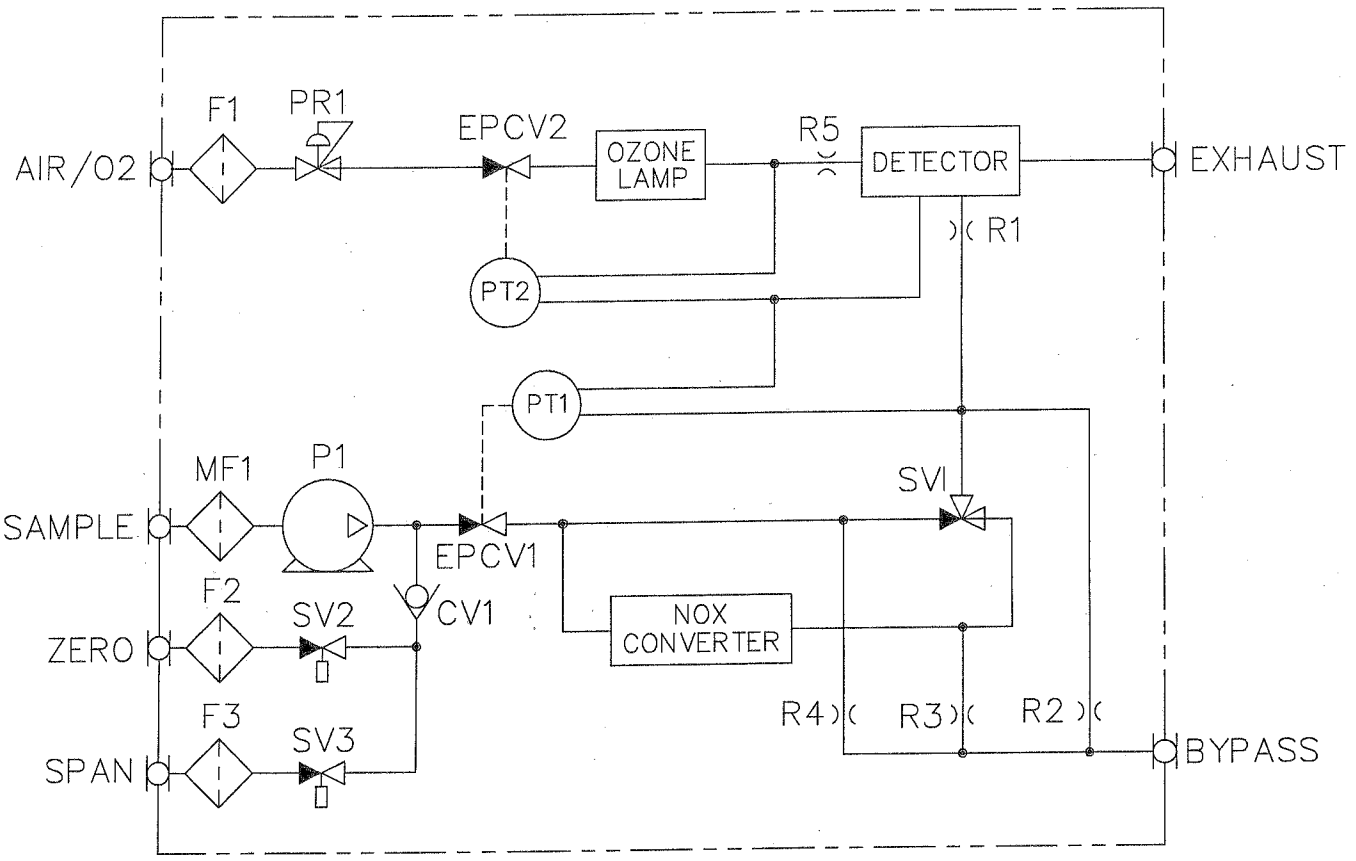
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm] TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX± ± .XXX±	CONTRACT NO.	gasanalyzers.com California Analytical Instruments, Inc.	
MATERIAL	APPROVALS / DRAWN G. GRISETA	DATE 1–27–03	FLOW DIAGRAM, 600–CLD W/ZERO/SPAN S/V
FINISH	CHECKED G. DEMINT	1–27–03	SIZE A / FSCM NO. / DWG. NO. 210062 / REV.
DO NOT SCALE DRAWING	ISSUED		SCALE / SHEET 1

APPLICATION		REVISIONS				
NEXT ASSY	USED ON	REV.	DESCRIPTION	DRAWN	DATE	APPROVED



CAPILLARIES	SIZE	MATERIAL
R1–DETECTOR	1.75" .007	PEEK
R2–SAMPLE	17.5" .020	S.S.
R3–CONVERTER	20.0" .020	S.S.
R4–EPC	13.0" .030	S.S.
R5–OZONE LAMP	.45" .007	PEEK

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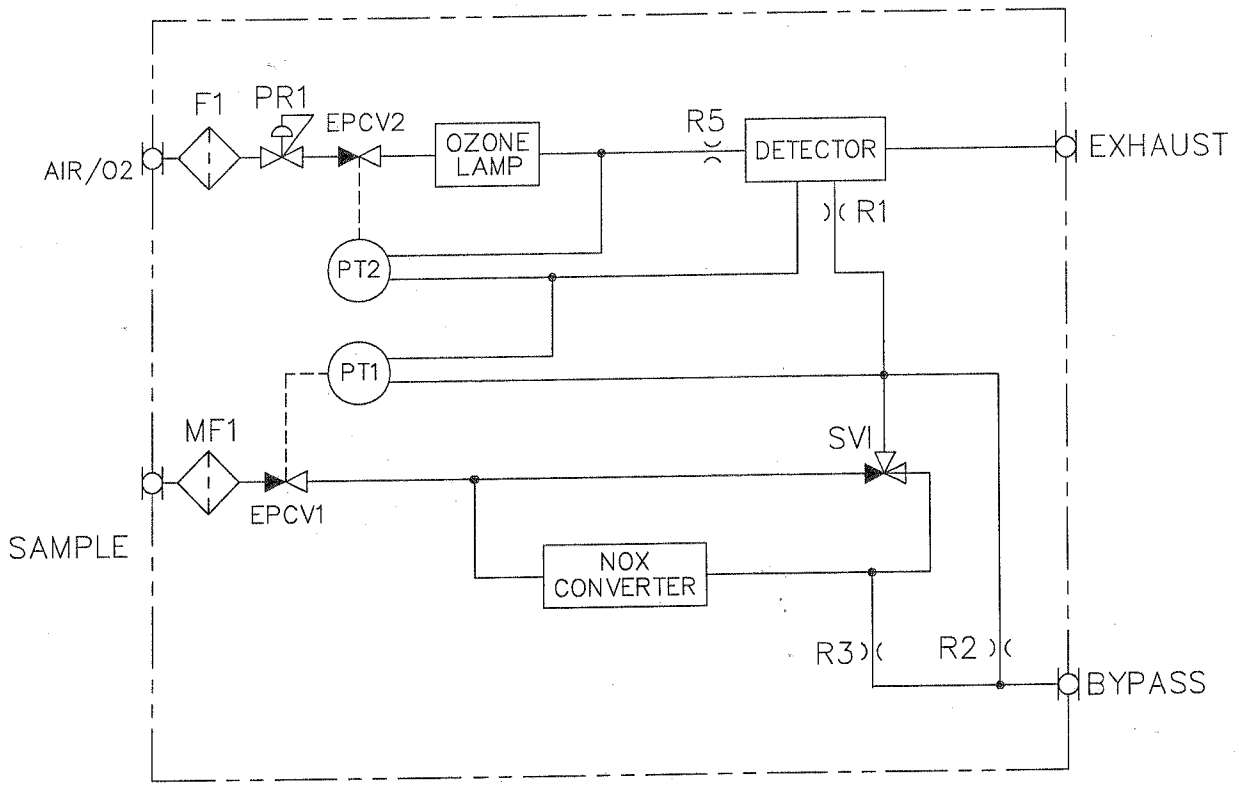
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm] TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX± ± .XXX±	CONTRACT NO.	gasanalyzers.com California Analytical Instruments, Inc.	
MATERIAL	APPROVALS / DRAWN G. GRISETA	DATE 1-27-03	FLOW DIAGRAM, 600-CLD W/PUMP AND ZERO/SPAN S/V
FINISH	CHECKED G. DEMINT	1-27-03	SIZE A / FSCM NO. / DWG. NO. 210064 / REV.
DO NOT SCALE DRAWING	ISSUED		SCALE / SHEET 1

APPLICATION		REVISIONS				
NEXT ASSY	USED ON	REV.	DESCRIPTION	DRAWN	DATE	APPROVED



CAPILLARIES	SIZE	MATERIAL
R1–DETECTOR	1.75" .007	PEEK
R2–SAMPLE	17.5" .020	S.S.
R3–CONVERTER	20.0" .020	S.S.
R5–OZONE LAMP	.45" .007	PEEK

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm]
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
± .XX± ±
.XXX±

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN M. DELACRUZ	1–7–04
CHECKED G. DeMINT	1–7–04
ISSUED	

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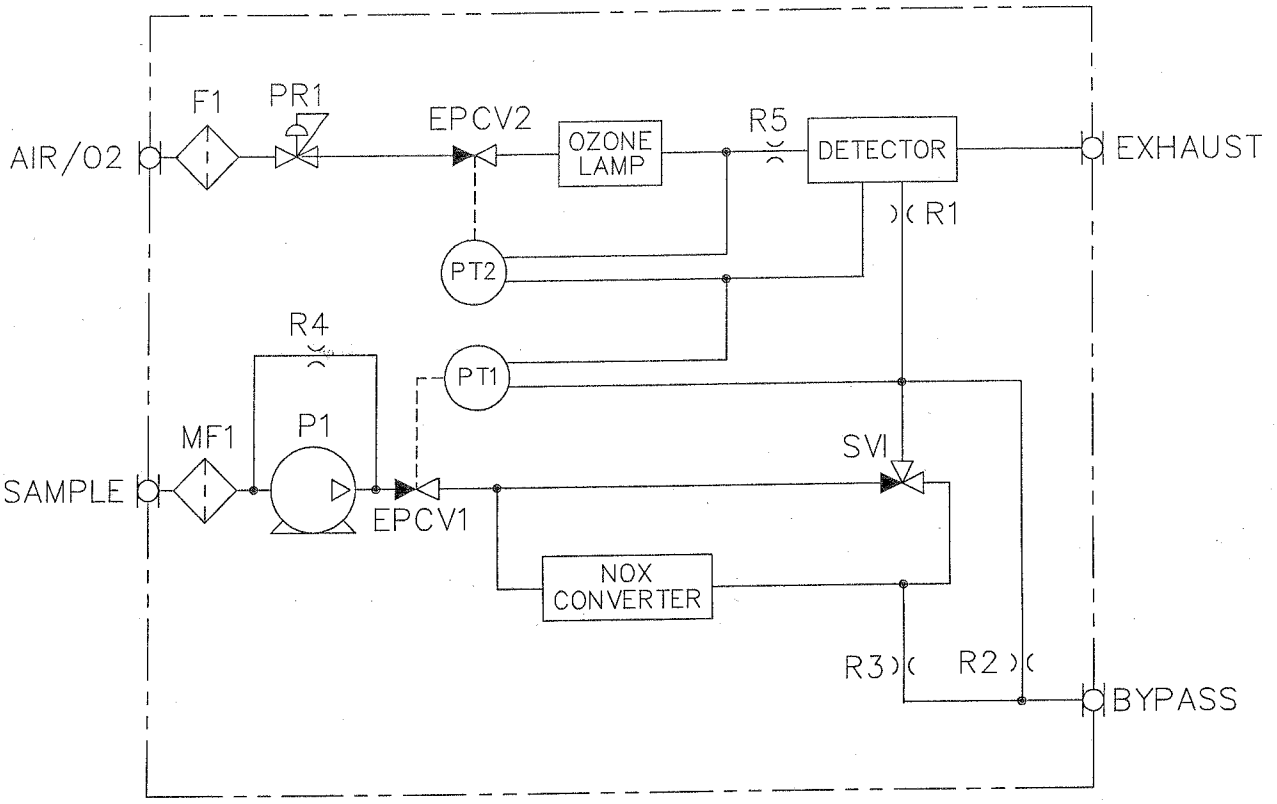
FLOW DIAGRAM, 600–CLD LOW FLOW OPTION

SIZE	FSCM NO.	DWG. NO.	REV.
A		210065	

SCALE

SHEET 1

APPLICATION		REVISIONS				
NEXT ASSY	USED ON	REV.	DESCRIPTION	DRAWN	DATE	APPROVED



CAPILLARIES	SIZE	MATERIAL
R1–DETECTOR	1.75" .007	PEEK
R2–SAMPLE	17.5" .020	S.S.
R3–CONVERTER	20.0" .020	S.S.
R4–EPC	13.0" .030	S.S.
R5–OZONE LAMP	.45" .007	PEEK

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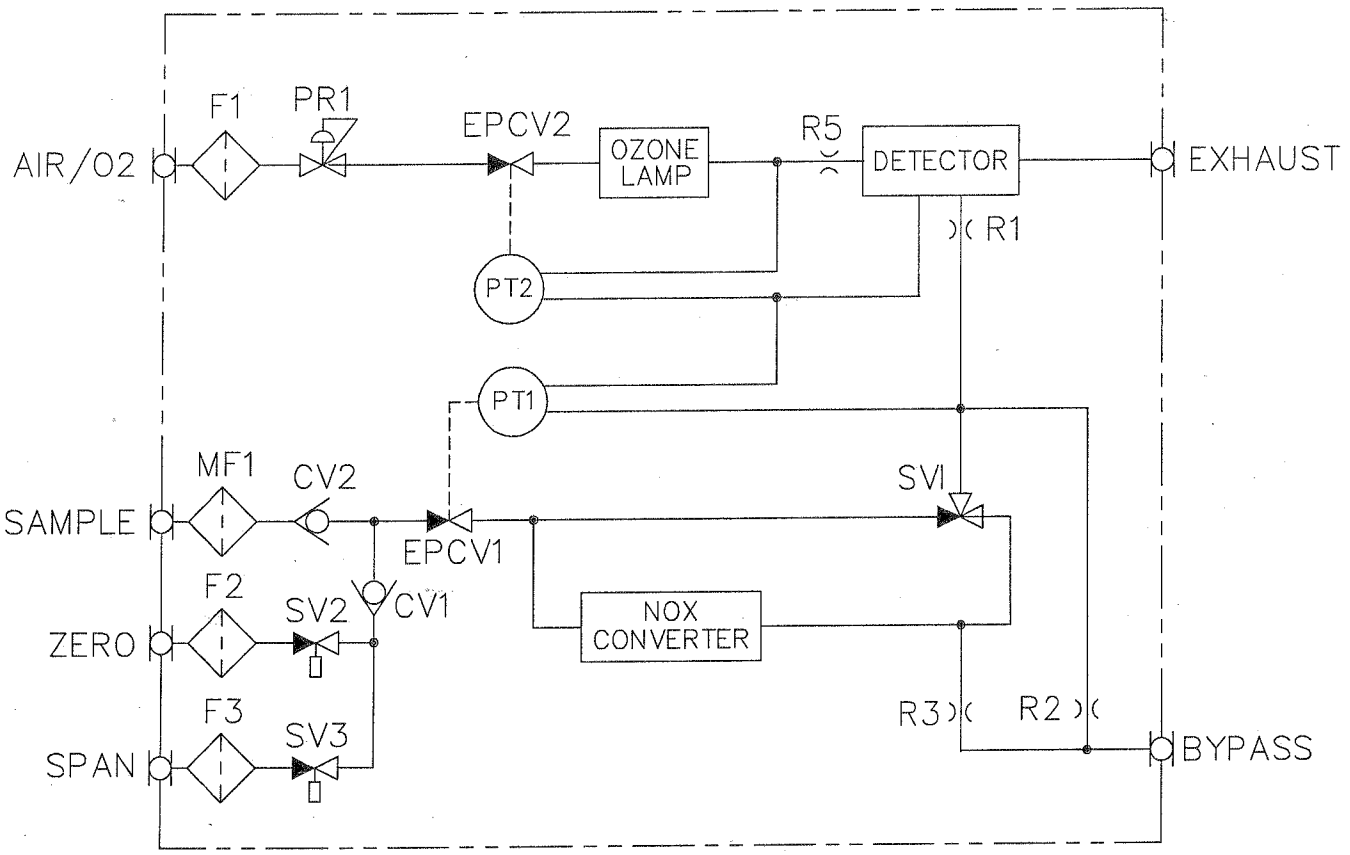
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm] TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX± ± .XXX±	CONTRACT NO.		CAI
MATERIAL	APPROVALS	DATE	FLOW DIAGRAM, 600–CLD LOW FLOW OPTION, W/PUMP
	DRAWN M. DELACRUZ	1–7–05	
FINISH	CHECKED G. DeMINT	1–7–05	SIZE A / FSCM NO. / DWG. NO. 210157 / REV.
	ISSUED		
DO NOT SCALE DRAWING			SCALE / SHEET 1

APPLICATION		REVISIONS				
NEXT ASSY	USED ON	REV.	DESCRIPTION	DRAWN	DATE	APPROVED



CAPILLARIES	SIZE	MATERIAL
R1–DETECTOR	1.75" .007	PEEK
R2–SAMPLE	17.5" .020	S.S.
R3–CONVERTER	20.0" .020	S.S.
R5–OZONE LAMP	.45" .007	PEEK

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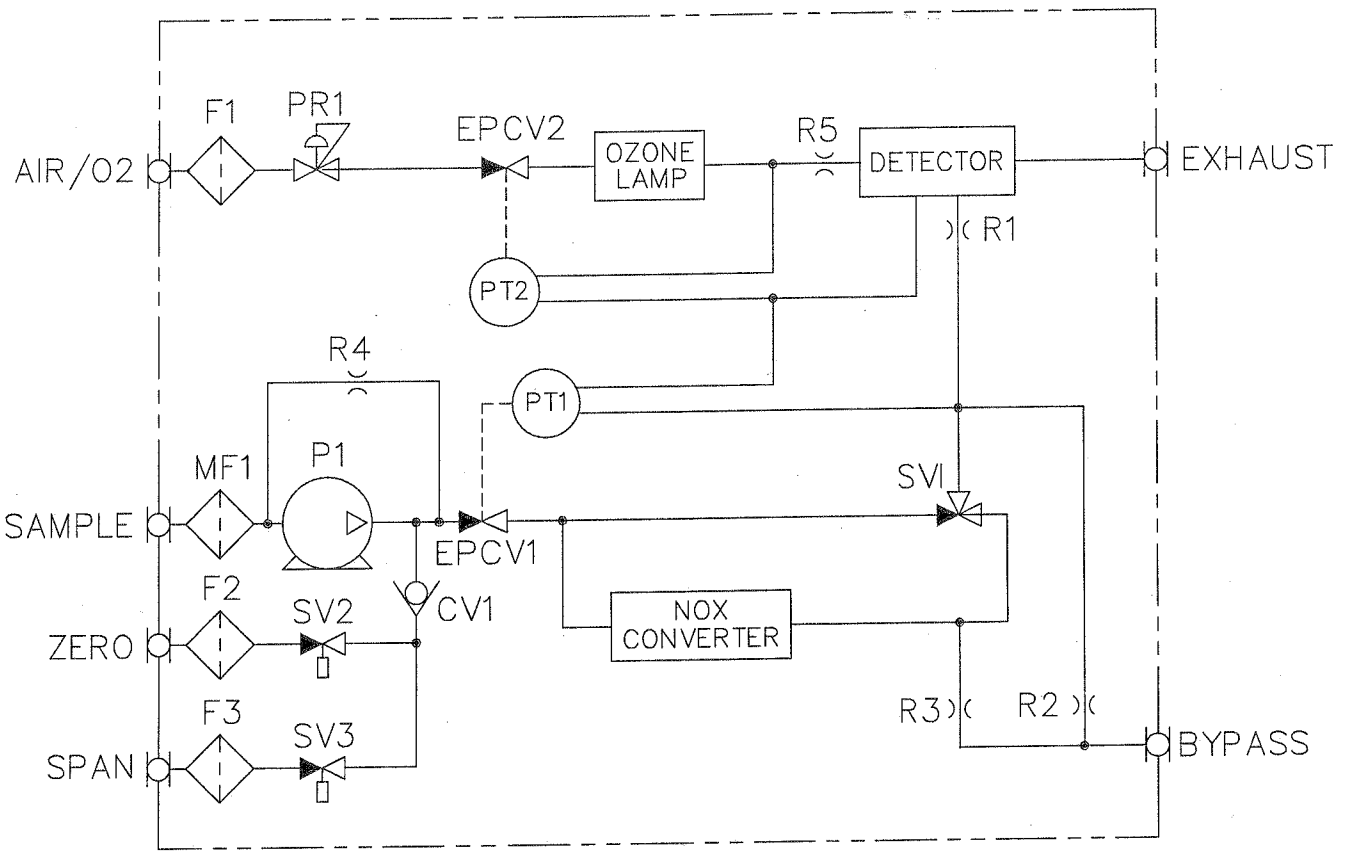
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm] TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX± ± .XXX±	CONTRACT NO.	gasanalyzers.com California Analytical Instruments, Inc.	
MATERIAL	APPROVALS / DRAWN M. DELACRUZ	DATE 1–7–05	FLOW DIAGRAM, 600–CLD W/ZERO/SPAN S/V LOW FLOW OPTION
FINISH	CHECKED G. DeMINT	1–7–05	SIZE A / FSCM NO. / DWG. NO. 210066 / REV.
DO NOT SCALE DRAWING	ISSUED		SCALE / SHEET 1

APPLICATION		REVISIONS				
NEXT ASSY	USED ON	REV.	DESCRIPTION	DRAWN	DATE	APPROVED



CAPILLARIES	SIZE	MATERIAL
R1–DETECTOR	1.75" .007	PEEK
R2–SAMPLE	17.5" .020	S.S.
R3–CONVERTER	20.0" .020	S.S.
R4–EPC	13.0" .030	S.S.
R5–OZONE LAMP	.45" .007	PEEK

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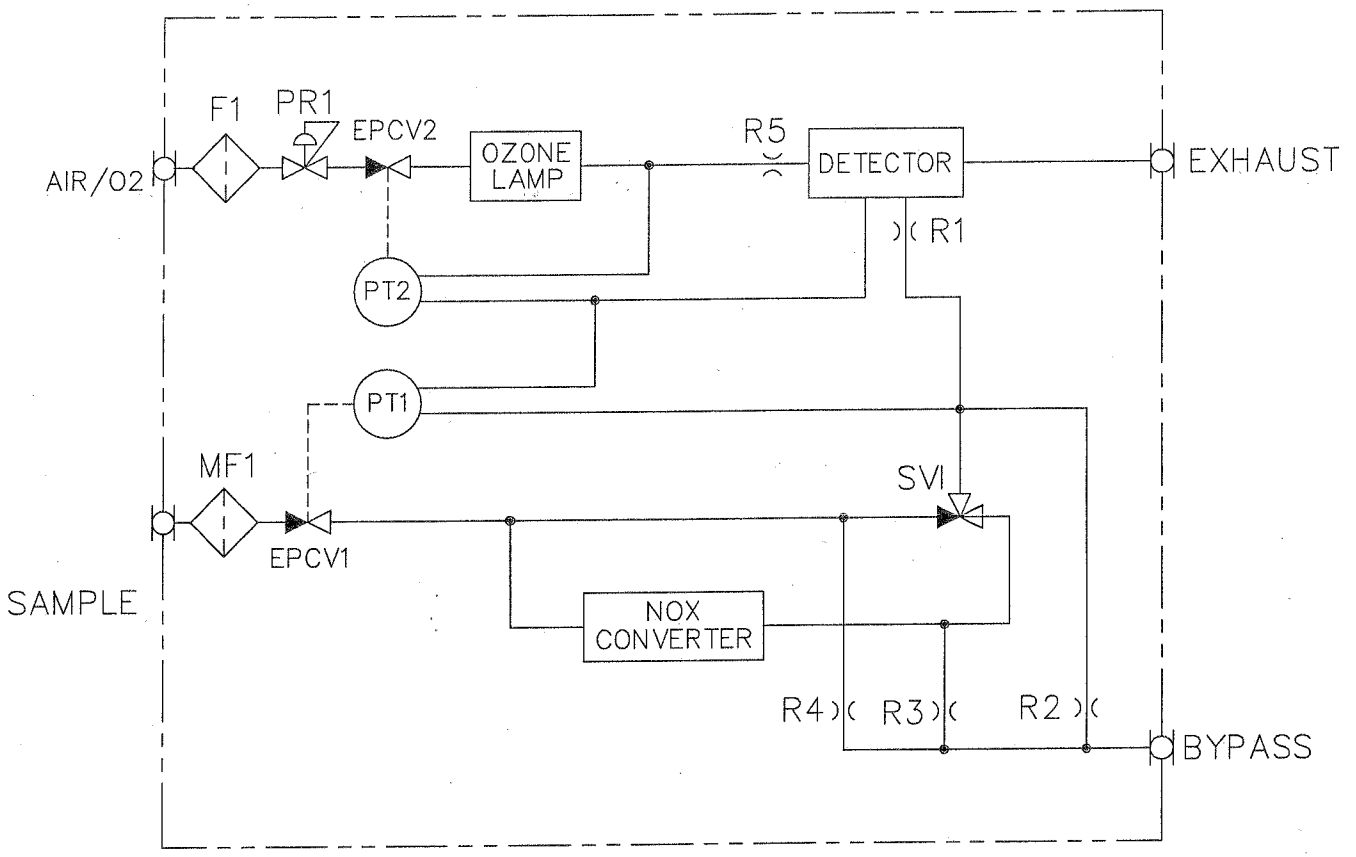
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm] TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX± ± .XXX±	CONTRACT NO.		gasanalyzers.com — California Analytical Instruments, Inc.
MATERIAL	APPROVALS	DATE	FLOW DIAGRAM, 600–CLD W/PUMP AND ZERO/SPAN S/V LOW FLOW OPTION
	DRAWN M. DELACRUZ	1–7–05	
FINISH	CHECKED G. DeMINT	1–7–05	SIZE A / FSCM NO. / DWG. NO. 210068 / REV.
	ISSUED		
DO NOT SCALE DRAWING			SCALE / SHEET 1

APPLICATION		REVISIONS				
NEXT ASSY	USED ON	REV.	DESCRIPTION	DRAWN	DATE	APPROVED



CAPILLARIES	SIZE	MATERIAL	~ FLOW (cc)
R1	1.5" .010	PEEK	50
R2	7" .020	SS	150
R3	7" .020	SS	150
R4	7" .020	SS	150
R5	.45" .007	PEEK	350

ORIGINAL

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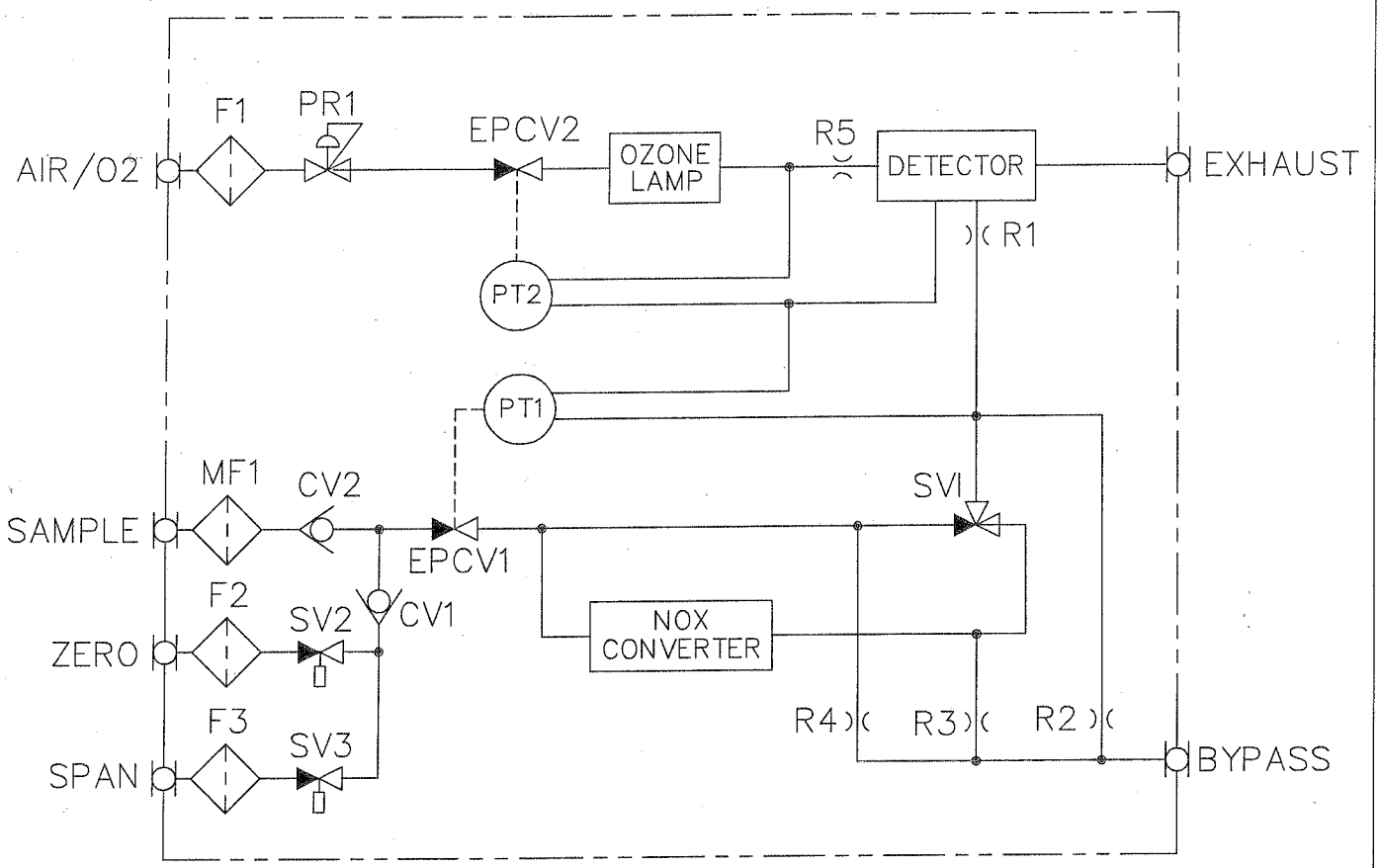
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm] TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX± ± .XXX±	CONTRACT NO.	gasanalyzers.com — California Analytical Instruments, Inc.	
MATERIAL	APPROVALS	DATE	FLOW DIAGRAM, 600-CLD LOW PRESSURE OPTION
	DRAWN G. GRISETA	1-14-04	
FINISH	CHECKED T. SJOSTROM	1-14-04	SIZE A / FSCM NO. / DWG. NO. 210086 / REV.
DO NOT SCALE DRAWING	ISSUED		SCALE / SHEET 1

APPLICATION		REVISIONS				
NEXT ASSY	USED ON	REV.	DESCRIPTION	DRAWN	DATE	APPROVED



CAPILLARIES	SIZE	MATERIAL	~ FLOW (cc)
R1	1.5" .010	PEEK	50
R2	7" .020	SS	150
R3	7" .020	SS	150
R4	7" .020	SS	150
R5	.45" .007	PEEK	350

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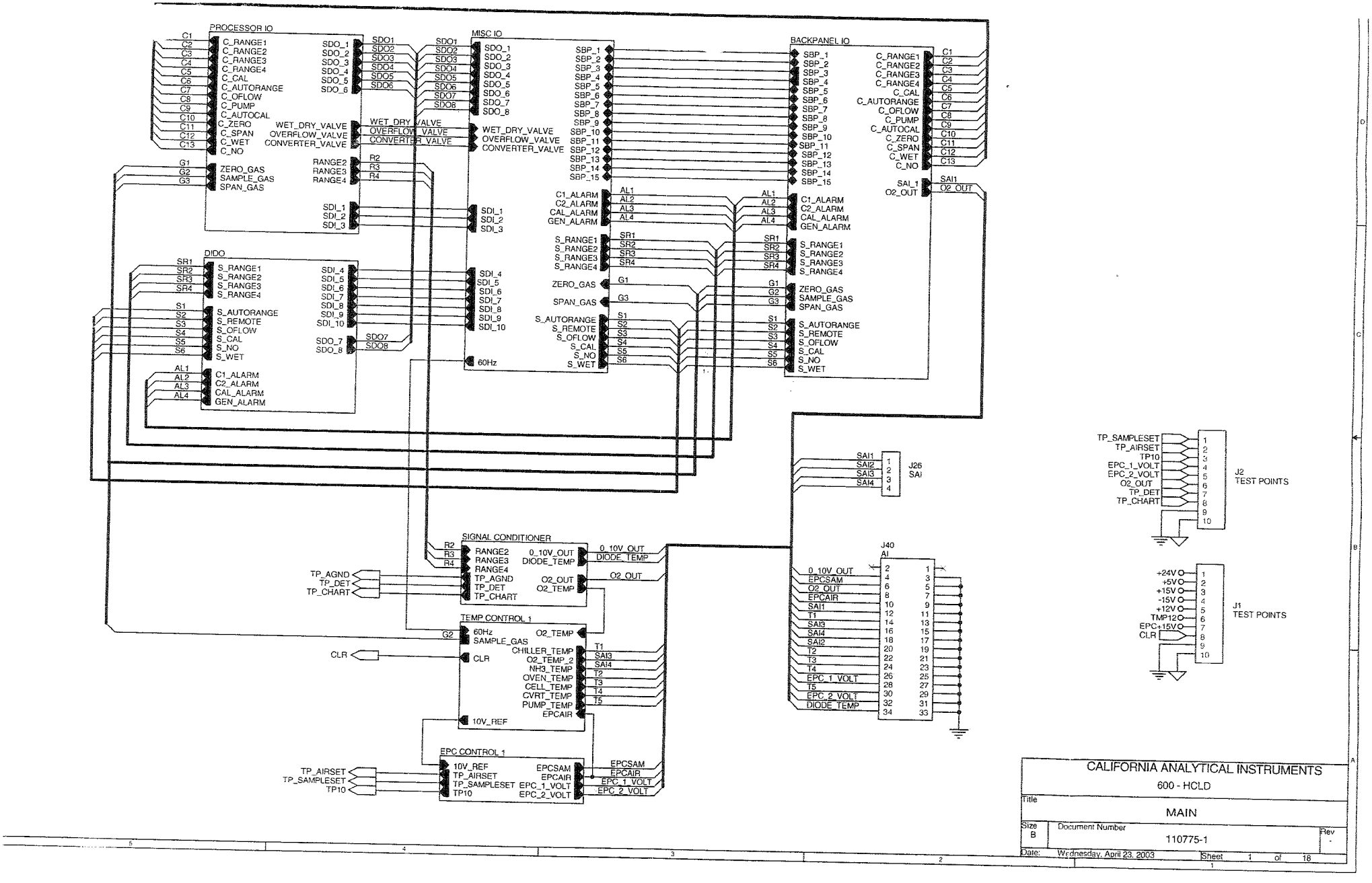
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES [mm] TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX± ± .XXX±	CONTRACT NO.	gasanalyzers.com California Analytical Instruments, Inc.	
MATERIAL	APPROVALS / DRAWN G. GRISETA	DATE 1-14-04	FLOW DIAGRAM, 600-CLD W/ZERO/SPAN S/V-LOW PRESS OPTION
FINISH	CHECKED T. SJOSTROM / ISSUED	1-14-04	SIZE A / FSCM NO. / DWG. NO. 210087 / REV.
DO NOT SCALE DRAWING			SCALE / SHEET 1



CALIFORNIA ANALYTICAL INSTRUMENTS

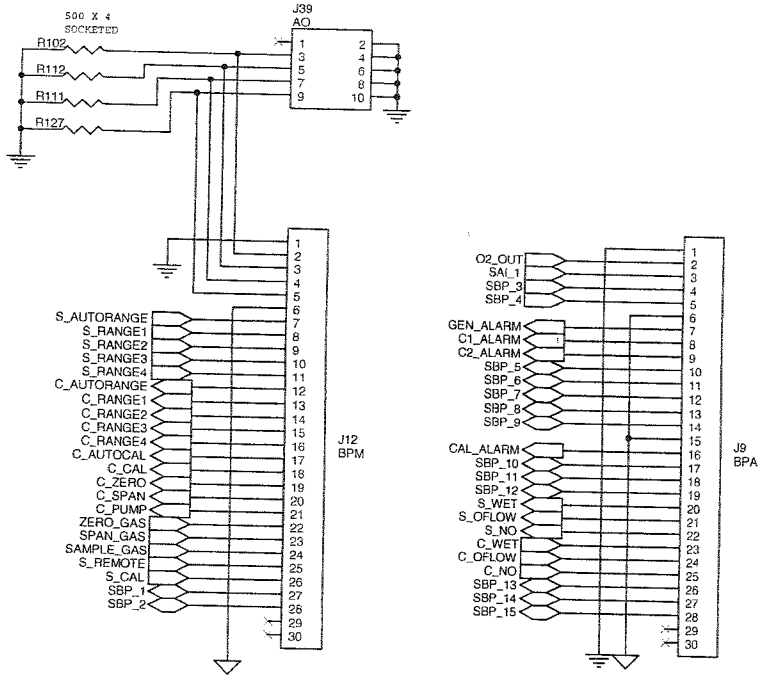
600 - HCLD

Title: MAIN

Size: B | Document Number: 110775-1 | Rev: -

Date: Wednesday, April 23, 2003 | Sheet 1 of 18

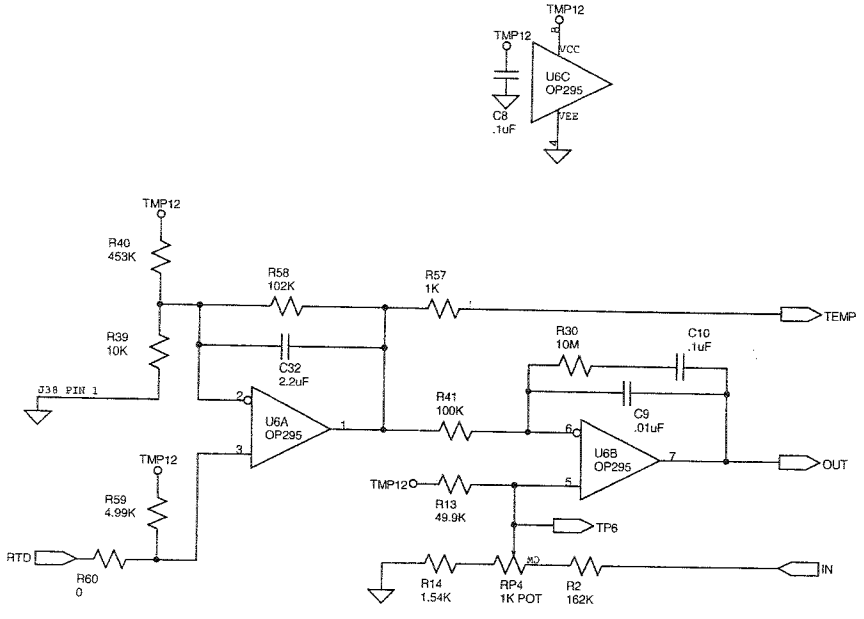
1. R1-R4 TO BE P[illegible]OUNTED



CALIFORNIA ANALYTICAL INSTRUMENTS	
600 - HCLD	
Title	BACKPANEL IO
Size: B	Document Number: 110775-1
Rev: -	
Date: Monday, October 13, 2003	Sheet 2 of 18

NOTES:

1. SEE TEMP CONTR FOR OTHER RTD CONNECTIONS TO GROUND
2. GROUND POINT SHOULD BE AT R39



CALIFORNIA ANALYTICAL INSTRUMENTS		
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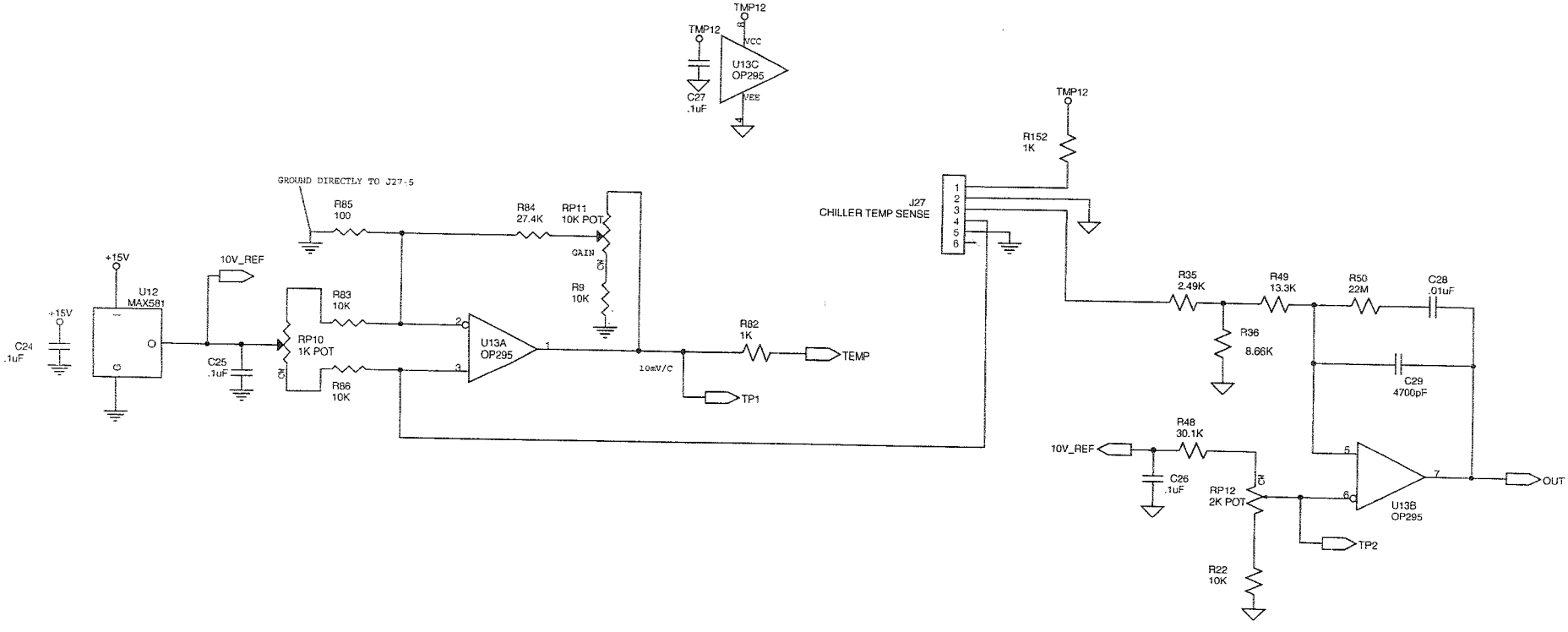
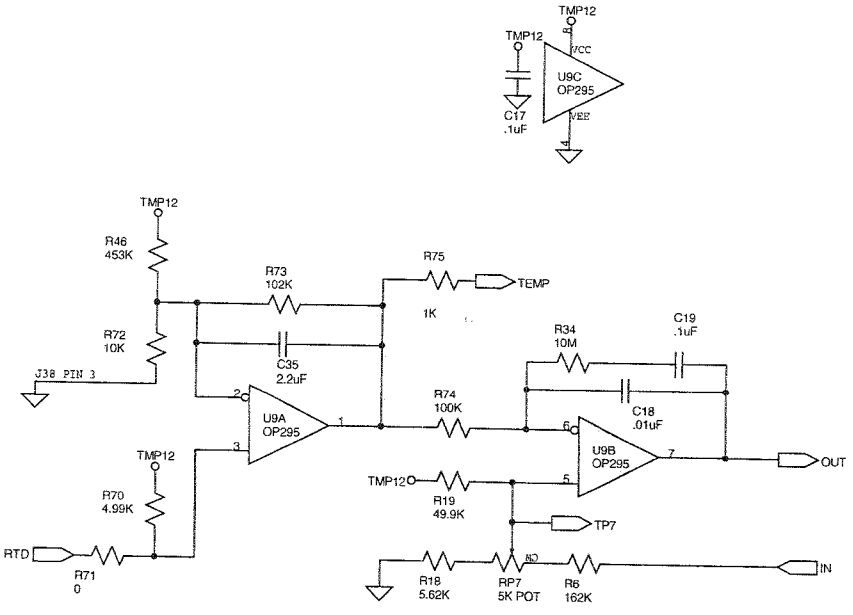
Title: CELL		
Size: B	Document Number: 110775-1	Rev: -
Date: Wednesday, April 23, 2003	Sheet 3 of 18	



CALIFORNIA ANALYTICAL INSTRUMENTS		
600 - HCLD		
Title: CHILLER		
Size: B	Document Number: 110775-1	Rev: -
Date: Wednesday, April 23, 2003	Sheet 4 of 18	

NOTES:

1. SEE TEMP CONTI R 1 FOR OTHER RTD CONNECTIONS TO GROUND
2. GROUND POINT S. ..D BE AT R72



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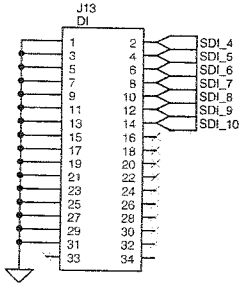
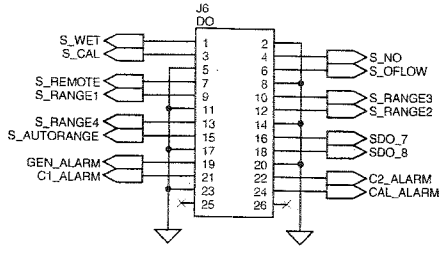
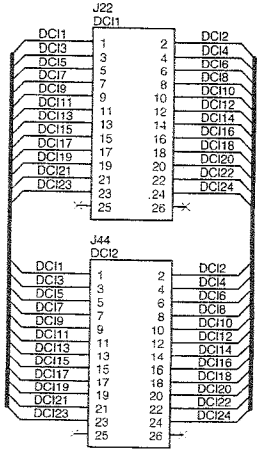
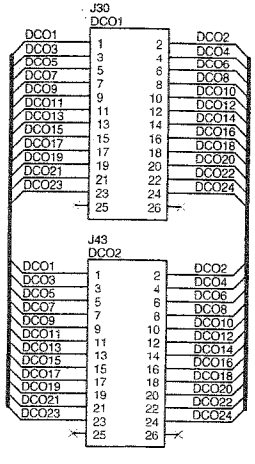
Title	CVRT
Size B	Document Number 110775-1 Rev -
Date: Wednesday, April 23, 2003	Sheet 5 of 18









CALIFORNIA ANALYTICAL INSTRUMENTS		
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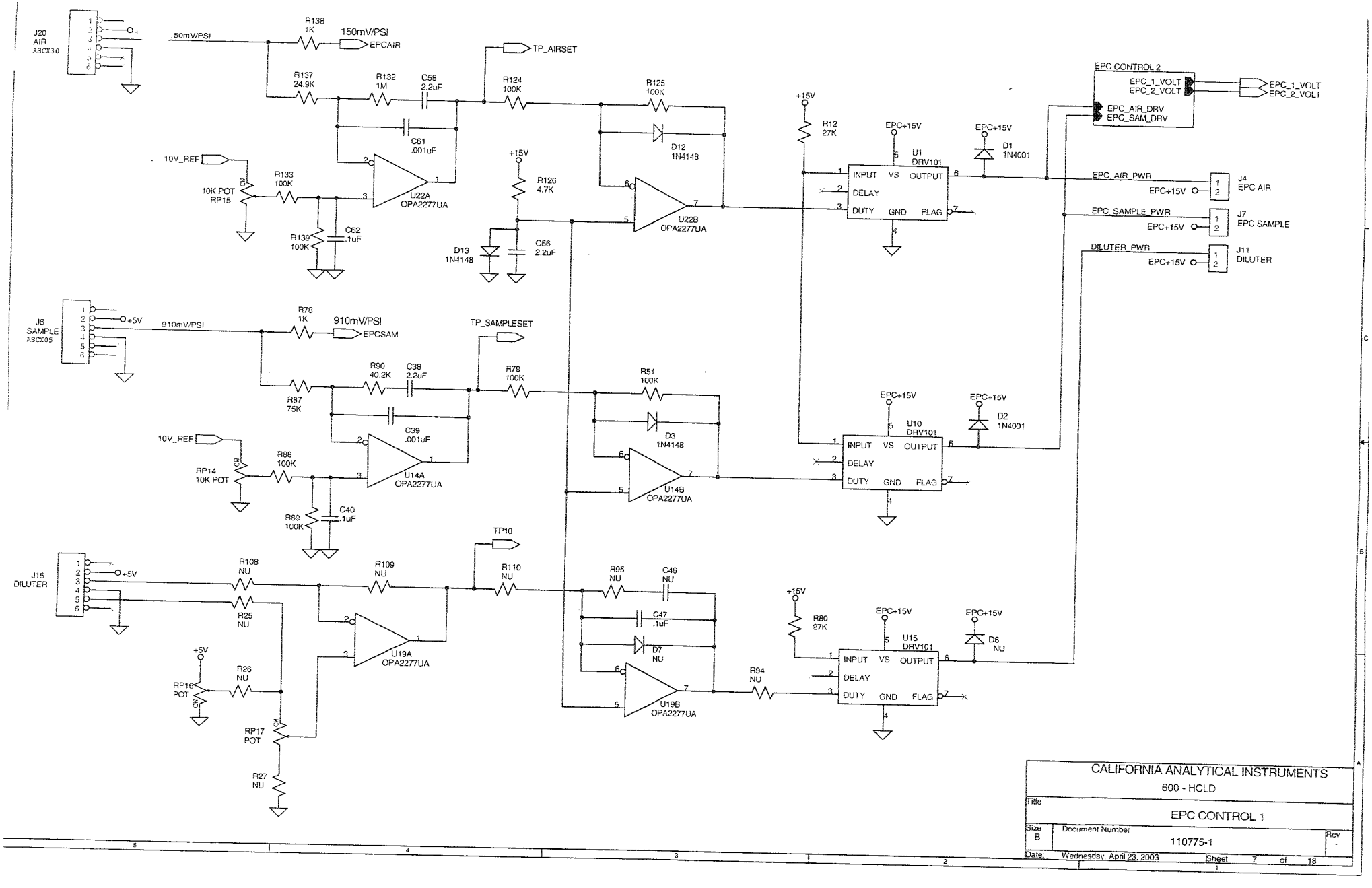
Size: B	Document Number: 110775-1	Rev: -
Date: Wednesday, April 23, 2003	Sheet 6 of 18	



CALIFORNIA ANALYTICAL INSTRUMENTS	
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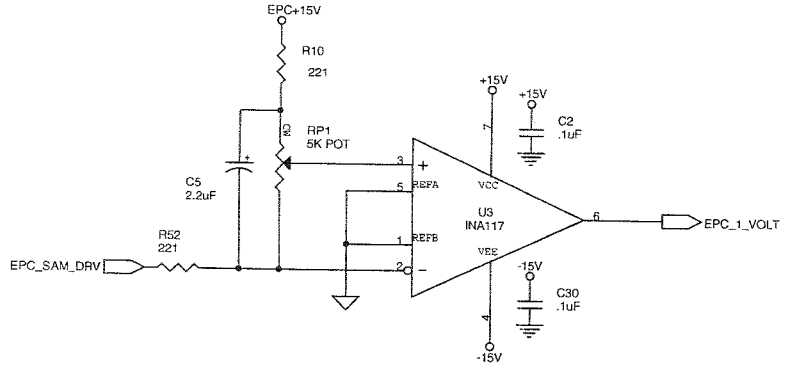
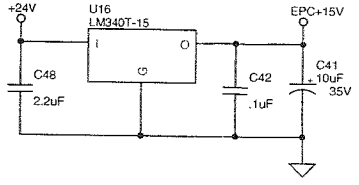
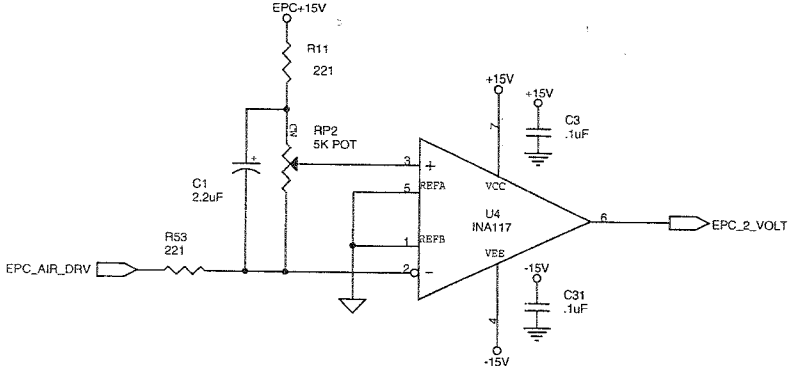
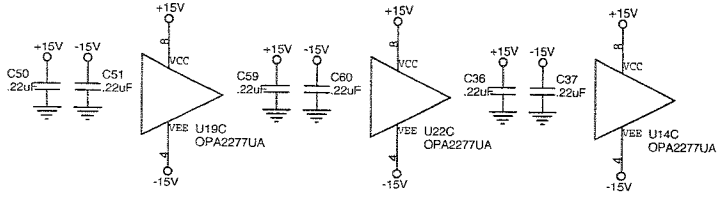
Title	EPC CONTROL 1
Size B	Document Number 110775-1 Rev -
Date: Wednesday, April 23, 2003	Sheet 7 of 18

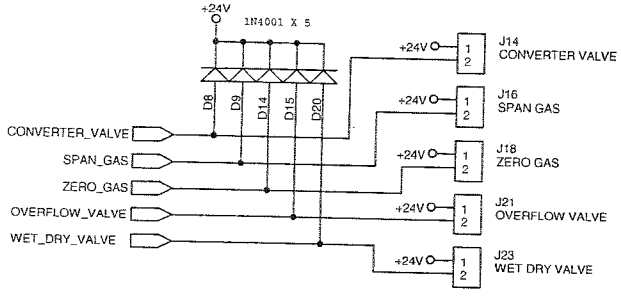


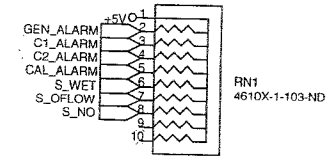


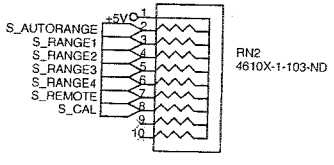


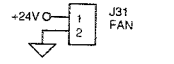


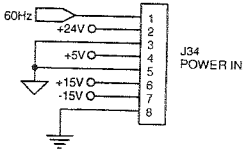
CALIFORNIA ANALYTICAL INSTRUMENTS		
600 - HCLD		
Title: EPC CONTROL 2		
Size: B	Document Number: 110775-1	Rev: -
Date: Wednesday, April 23, 2003	Sheet 8 of 16	

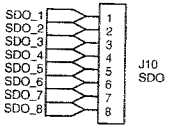


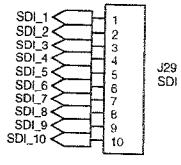


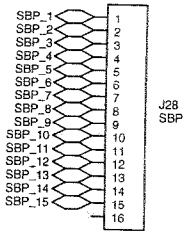


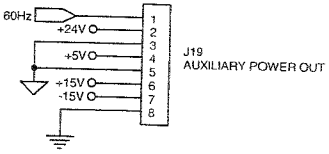


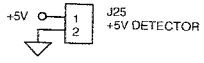


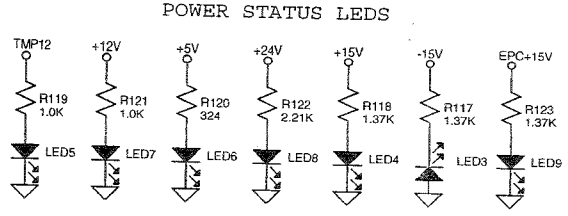












CALIFORNIA ANALYTICAL INSTRUMENTS		
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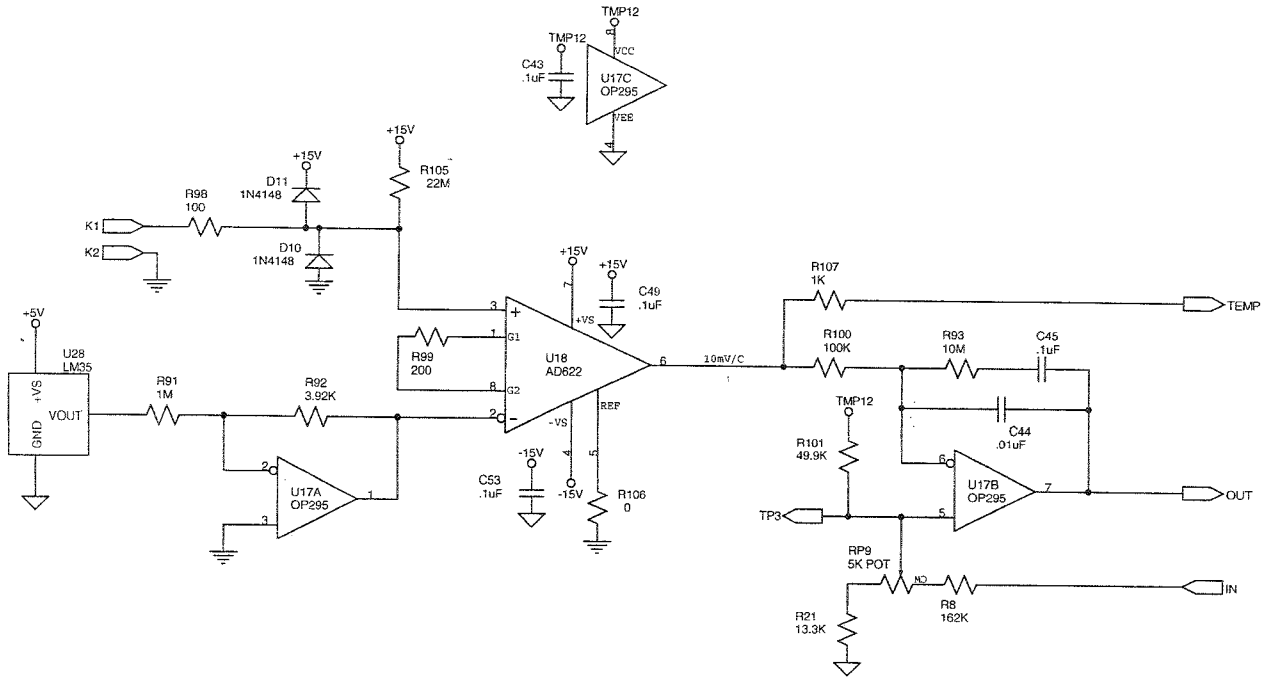
Title: MISC IO		
Size: B	Document Number: 110775-1	Rev: -
Date: Wednesday, April 23, 2003	Sheet 9 of 18	



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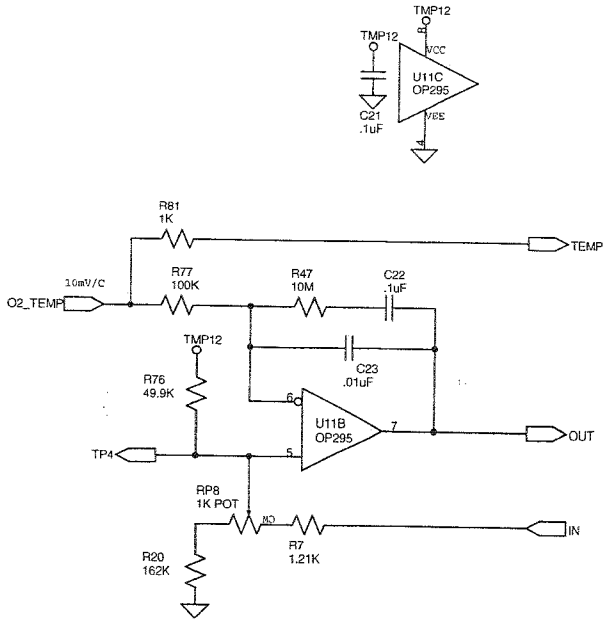
Size: B	Document Number: 110775-1	Rev: -
Date: Wednesday, April 23, 2003	Sheet 10 of 18	



CALIFORNIA ANALYTICAL INSTRUMENTS		
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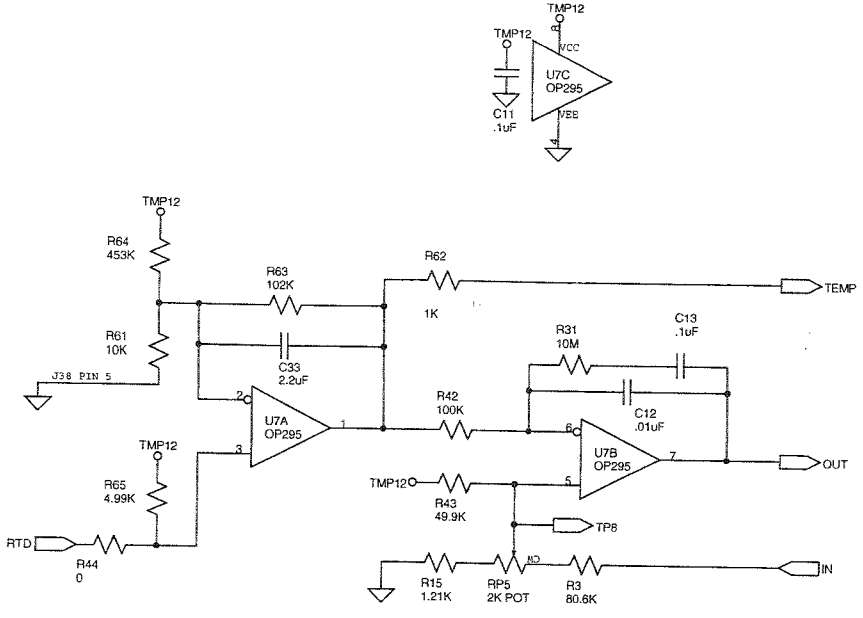
Title: O2		
Size: B	Document Number: 110775-1	Rev: -
Date: Wednesday, April 23, 2003	Sheet 11 of 18	

NOTES:

1. SEE TEMP CONT ER 1 FOR OTHER RTD CONNECTIONS TO GROUND
2. GROUND POINT SHOULD BE AT R61



CALIFORNIA ANALYTICAL INSTRUMENTS	
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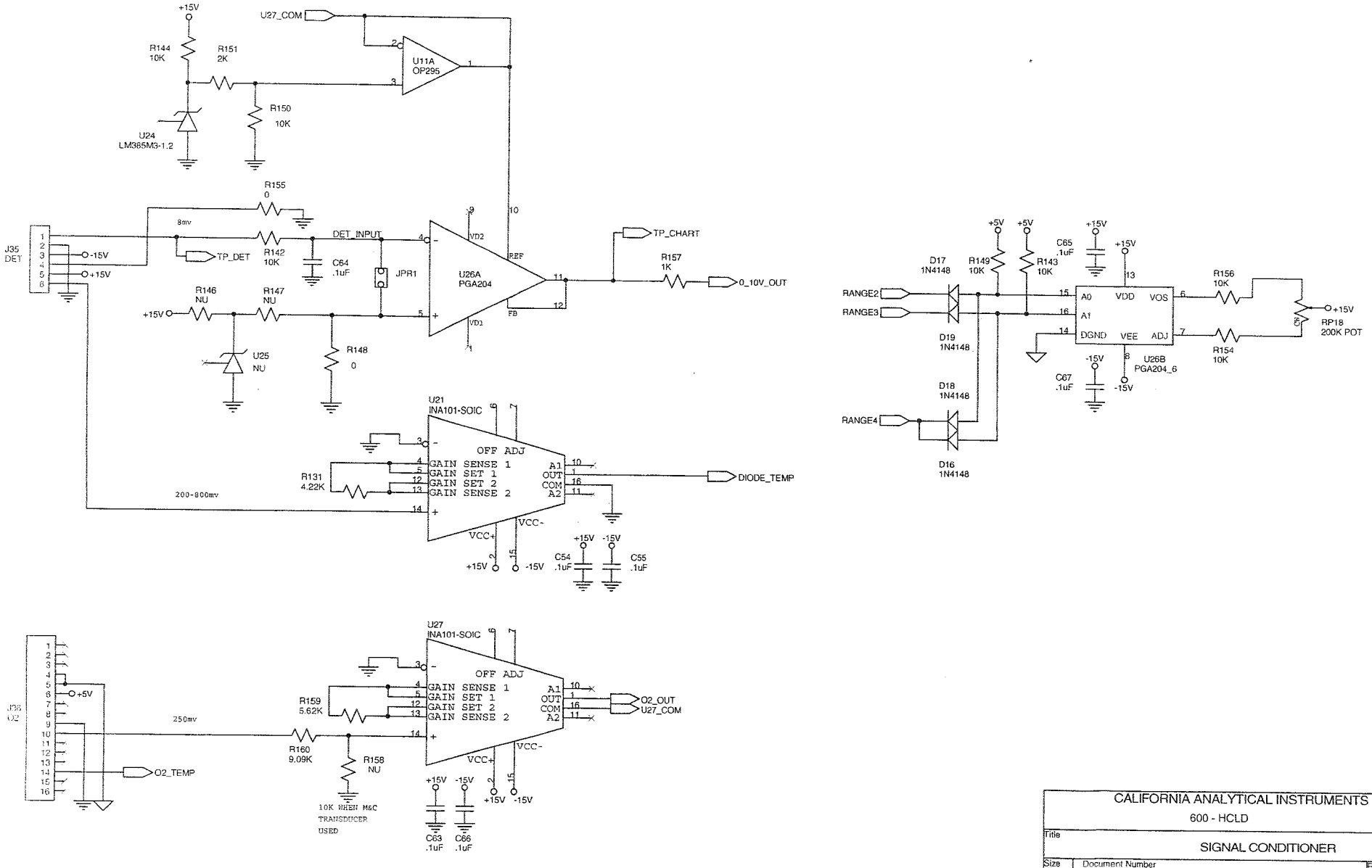
Title	OVEN
Size B	Document Number 110775-1 Rev -
Date: Wednesday, April 23, 2003	Sheet 12 of 18



CALIFORNIA ANALYTICAL INSTRUMENTS	
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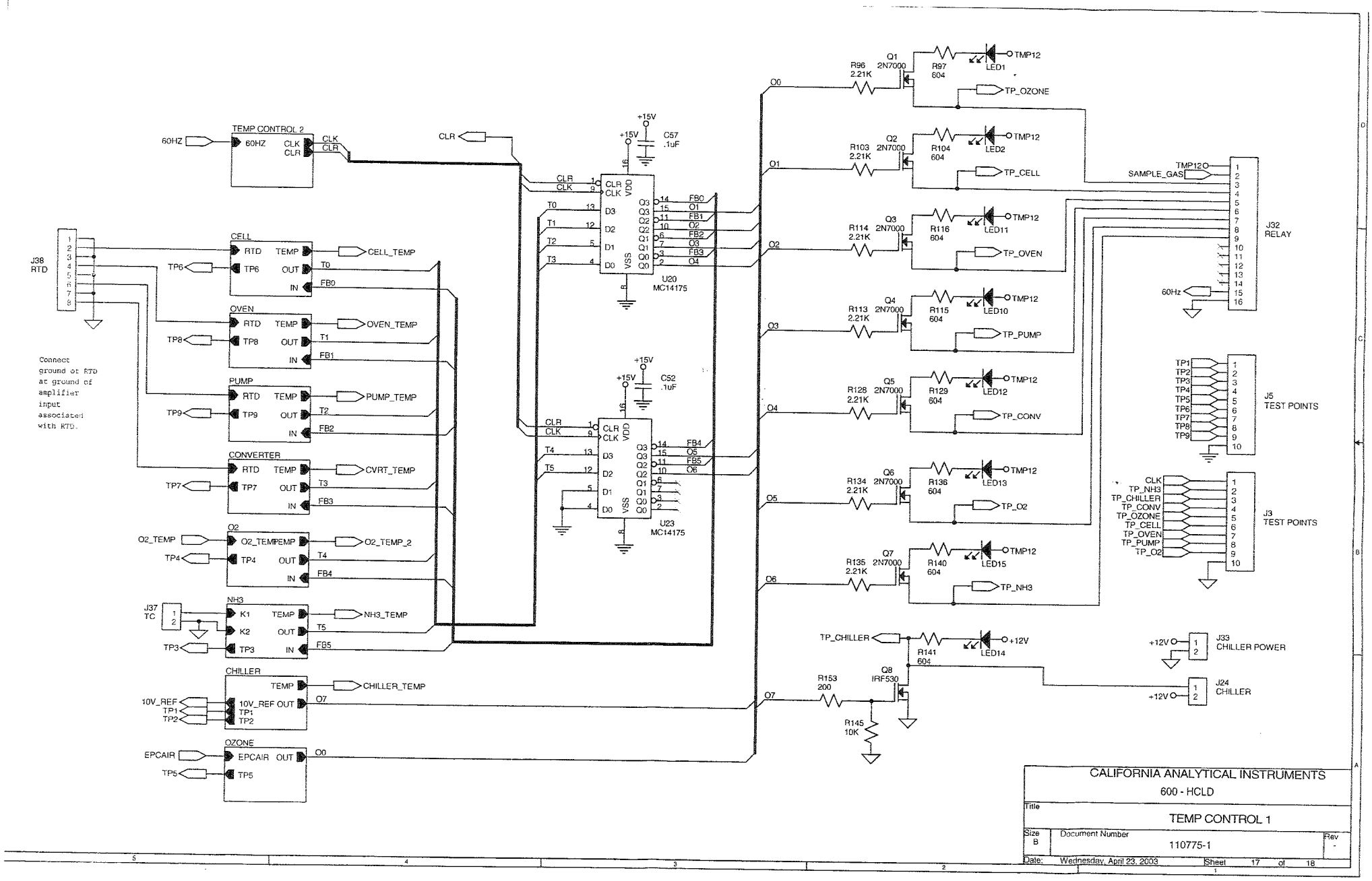
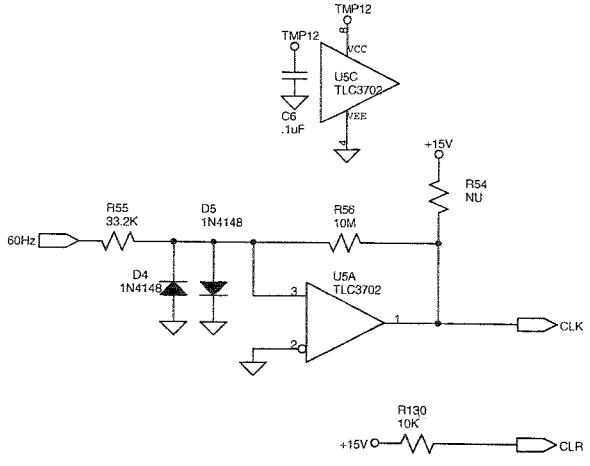
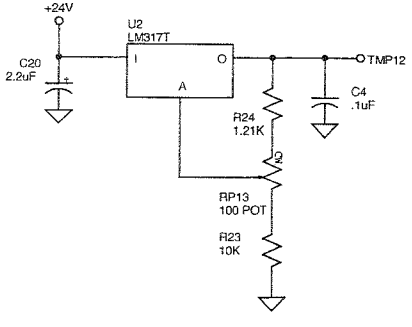
Title	SIGNAL CONDITIONER
Size B	Document Number 110775-1 Rev -
Date: Wednesday, April 23, 2003	Sheet 16 of 16



CALIFORNIA ANALYTICAL INSTRUMENTS	
600 - HCLD	
Title	TEMP CONTROL 1
Size B	Document Number 110775-1 Rev -
Date: Wednesday, April 23, 2003	Sheet 17 of 18





CALIFORNIA ANALYTICAL INSTRUMENTS		
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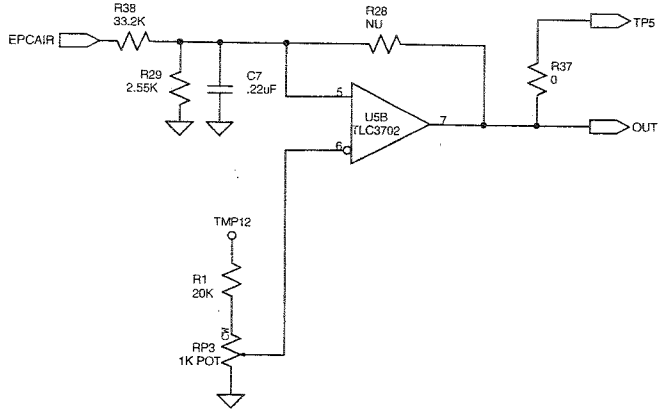
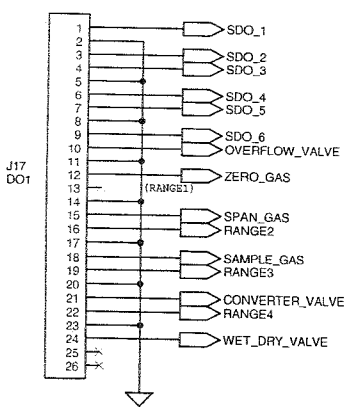
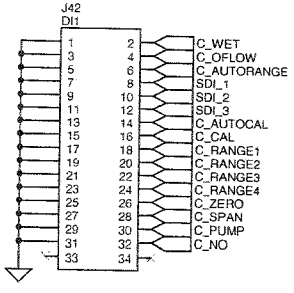
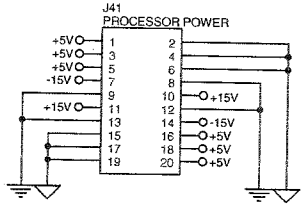
Title: TEMP CONTROL 2		
Size: B	Document Number: 110775-1	Rev: -
Date: Wednesday, April 23, 2003	Sheet 18 of 18	



CALIFORNIA ANALYTICAL INSTRUMENTS		
600 - HCLD		
Title: OZONE		
Size: B	Document Number: 110775-1	Rev: -
Date: Wednesday, April 23, 2003	Sheet 13 of 18	







CALIFORNIA ANALYTICAL INSTRUMENTS		
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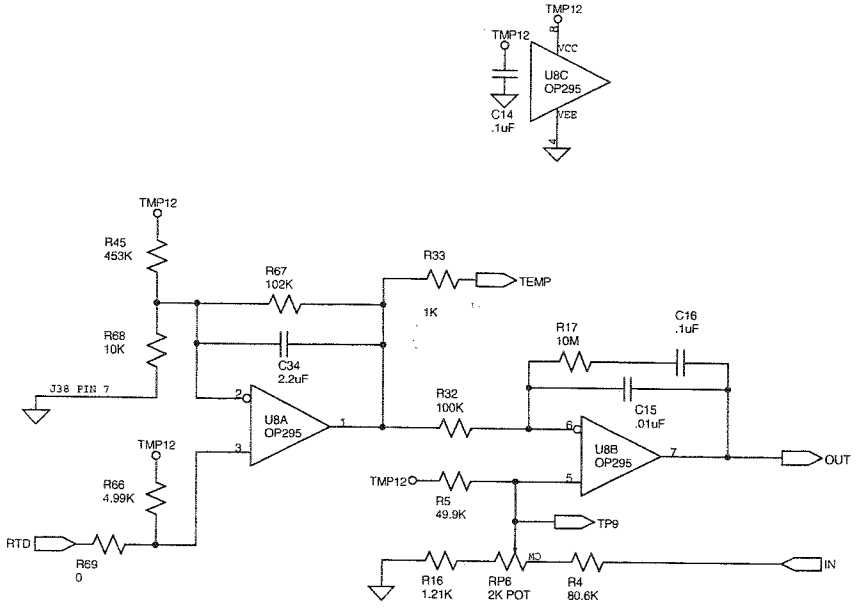
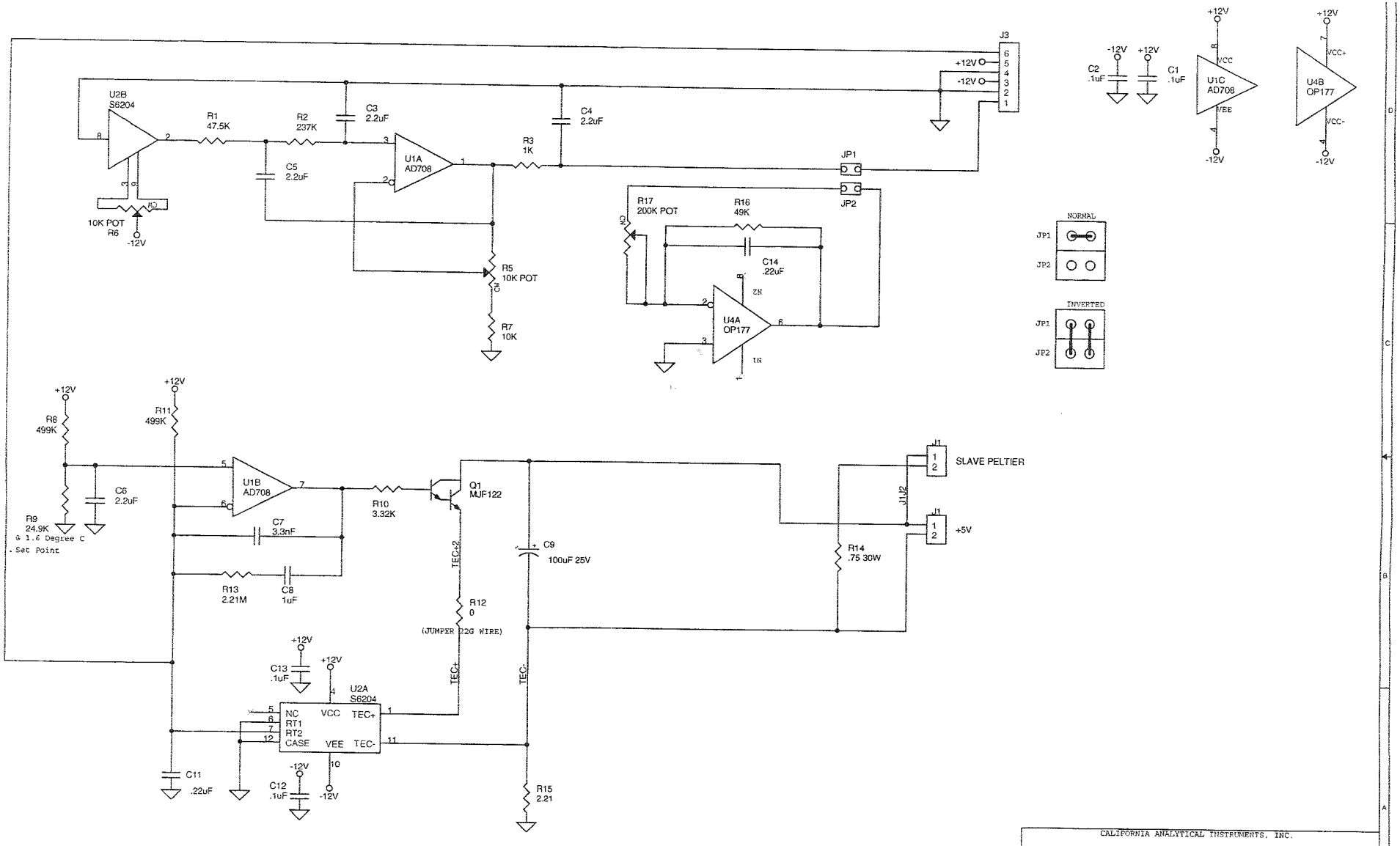
Title: PROCESSOR IO		
Size: B	Document Number: 110775-1	Rev: -
Date: Wednesday, April 23, 2003	Sheet 14 of 18	

NOTES:

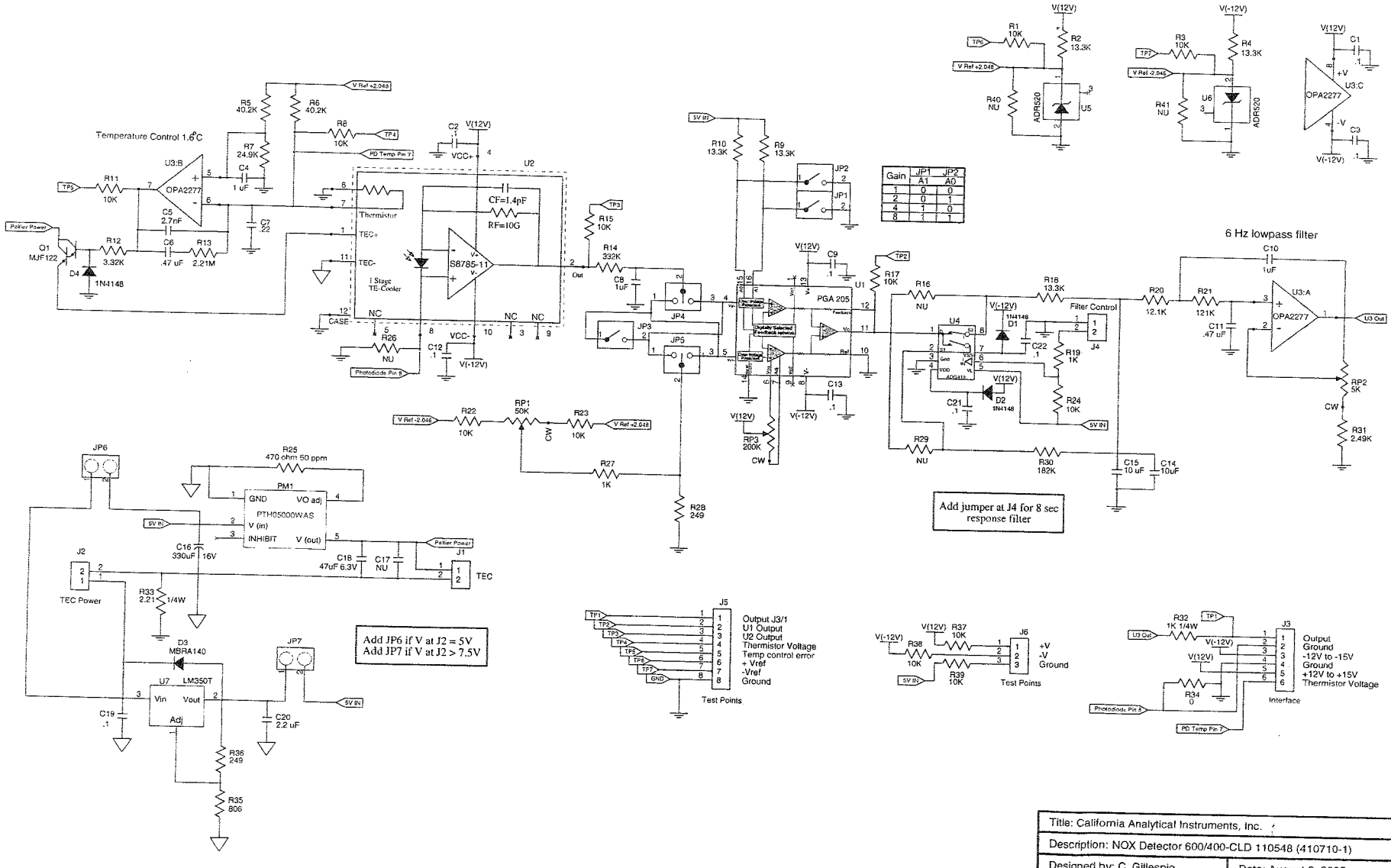
1. SEE TEMP CON[illegible]ER 1 FOR OTHER RTD CONNECTIONS TO GROUND
2. GROUND POINT SHOULD BE AT R68



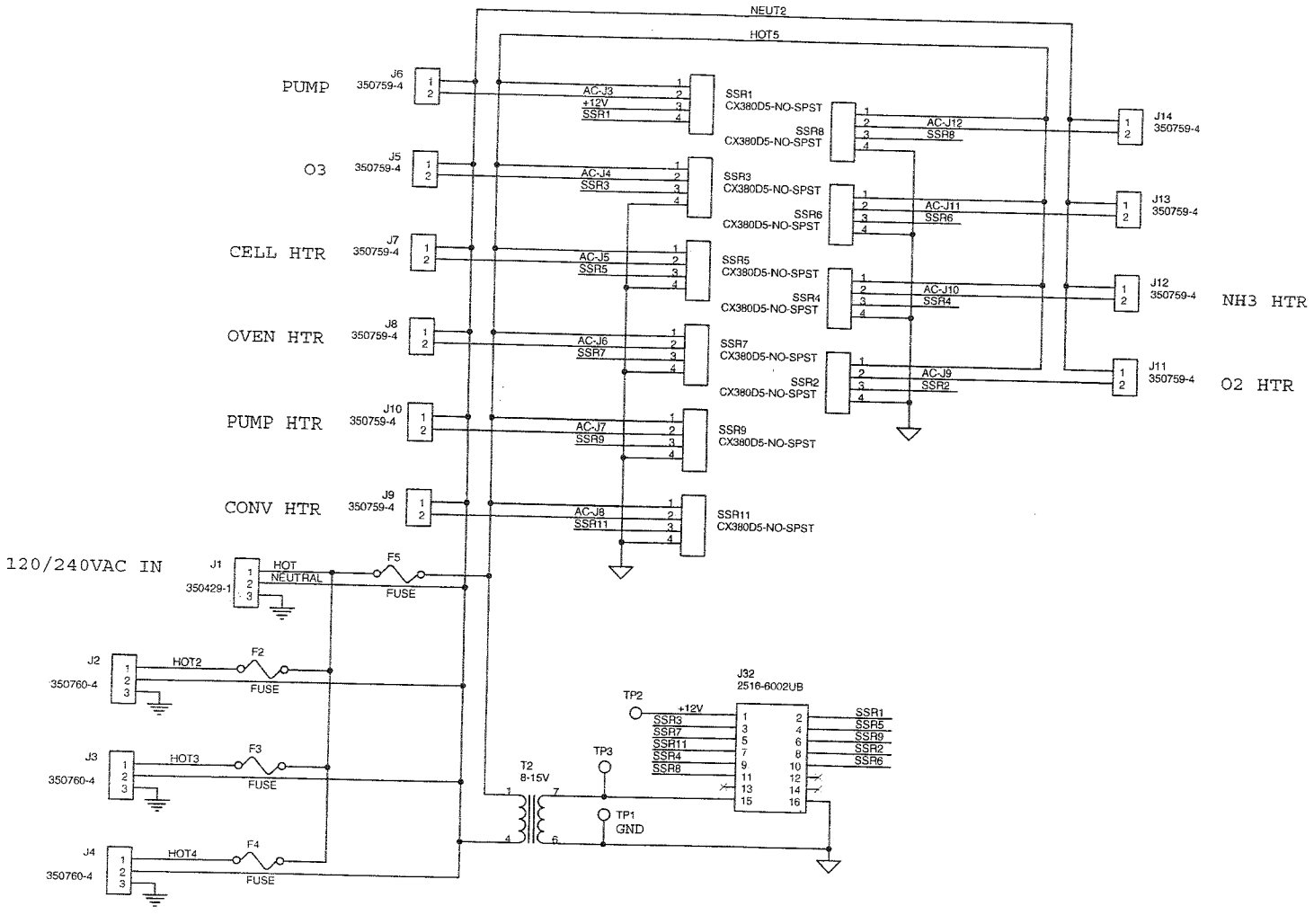
CALIFORNIA ANALYTICAL INSTRUMENTS		
600 - HCLD		
Title: PUMP		
Size: B	Document Number: 110775-1	Rev: -
Date: Wednesday, April 23, 2003	Sheet 15 of 18	



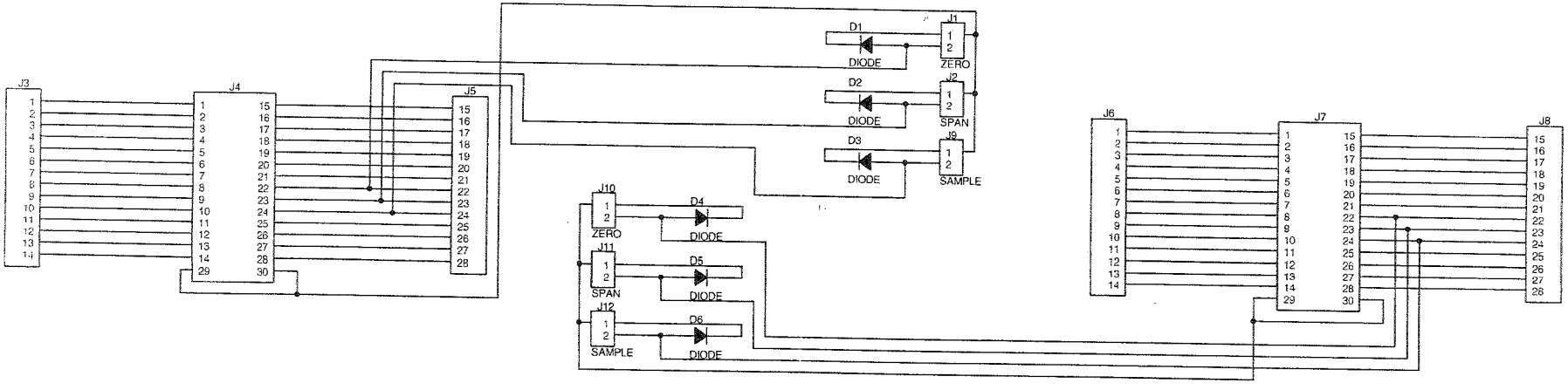
CALIFORNIA ANALYTICAL INSTRUMENTS, INC.		
Title: DETECTOR 0 5		
Size: B	Document Number: 410710-1	Rev: C
Date: Thursday, September 25, 2003	Sheet 1 of 1	



Title: California Analytical Instruments, Inc.		
Description: NOX Detector 600/400-CLD 110548 (410710-1)		
Designed by: C. Gillespie	Date: August 3, 2005	
Checked by:	Doc. No.:	Revision: E
Approved by:	Sheet 1 of 1	Size: B



Title	600 RELAY BOARD	
Size B	Document Number 110524-12	Rev B
Date: Tuesday, November 26, 2002	Sheet 1 of 1	



J1,J2,J9,J10,J11,J12 ARE MOLEX 22-23-2021

D1-D6ARE1N4001

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CALIFORNIA ANALYTICAL INSTRUMENTS		
ASSY BOARD TERMINAL BLOCK 600 IR/02		
Title: DUAL TERMINAL BLOCK		
Size	Document Number: ASSY 110748-2	Rev: A
Date: Tuesday, May 06, 2003	Sheet 1 of 1	